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PURĀTATTVA

BULLETIN OF THE INDIAN ARCHAEOLOGICAL SOCIETY

NUMBER 34 2003-2004

Editors

K.N. DIKSHIT AND K.S. RAMACHANDRAN

INDIAN ARCHAEOLOGICAL SOCIETY
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PURĀTATTVA

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V.S. Pathak
(1926 - 2003)

Professor Vishvambhar Saran Pathak, M.A. Ph.D. was born in 1926 at Hoshangabad, M.P., on the bank of the sacred Narmada. He passed Intermediate examination in 1946, from the Central Hindu College in first division, scoring the highest percentage of marks in that year. He repeated the same performance at B.A. examination (1948) as well, by obtaining the first position with first division. For his M.A. degree, he chose Ancient Indian History and Culture and studied the subject under such eminent scholars as Prof. Anand Sadashiva Altekar, Prof. Ramesh Chandra Majumdar, Prof. R.S. Tripathi, Prof. Rajbali Pandey, Prof. V.S. Agrawala and others. In 1950, at BHU he excelled the record set up by Prof. Ahmad Hasan Dani.

In 1950, he was appointed Research Assistant under Prof. R.C. Majumdar, the then Principal, College of Indology, who soon left for Nagpur University. In 1953, he became Education Officer in the Central Ministry of Education, New Delhi, but a year after he came back and joined the Banaras Hindu University as a Lecturer. In 1956, he submitted his Ph.D. thesis on "Major Brahmanical Religions of Northern India on the basis of Inscriptions (from 600 A.D. to 1200 A.D.)".

In 1958, he was appointed as Assistant Professor in the University of Sagar (now Harisingh Gaur Vishwavidyalaya), Sagar, M.P. In 1960, he went to London on the British Council Scholarship where he studied in the School of Oriental and African Studies. He wrote his second Ph.D. thesis entitled "The Ancient Historians of India" under the supervision of Prof. A.L. Basham. -In 1963, Dr. Pathak came to the Hindu University as Reader, but after a few months he went on deputation to Mexico as UNESCO Visiting Professor. In 1965, he joined the University of Gorakhpur as Professor and Head of the Department of Ancient History, Culture and Archaeology.

After his retirement from Gorakhpur University in 1984, he became a University Grant Commission's Visiting Fellow in the Department of Ancient Indian History, Culture and Archaeology, Nagpur University. Professor Pathak was appointed Vice-Chancellor of Gorakhpur University in 1992. He resigned this position ahead of the term preferring a purely academic life.

Professor Pathak was, till he breathed his last, engaged in annotating Bhoja's *'Tattva Prakasha'* a seminal Text on Shaiva Siddhanta and two commentaries on it by Shri Kumar and Aghor Shiva. He was also engaged in the Proto-Vedic studies for the last fifteen years. He breathed his last on the 19th December, 2003.

His love of music was not known to many. He was very fond of music, both vocal as well as instrumental.

– **D.N.Tripathi**



A.P. Khatri
(1932 - 2004)

Dr Atma Prakash Khatri was born on 8th April 1932 at Bahawalpur, now in Pakistan. In the wake of the partition of the country, he moved to Punjab and did most of his schooling in India, including B.Sc. (Hons.) and M. Sc. After that he joined the Deccan College, Pune and obtained his Ph.D. in 1957 in Prehistoric Archaeology under the guidance of Prof. H.D. Sankalia

During his long career of four decades he held many positions - Asstt. Professor (Anthropology), Guwahati University (1957-58); Senior Research Fellow, CSIR (1958-59), Senior Research Fellow in Geology, Harvard University, Cambridge, Mass., USA; Senior Research Scientist, CNRS, Institute de Paleontologie Humaine, Paris (1960-62), Pool Officer, CSIR (1962-64), Senior Research Scientist, CSIR (1964-66), Research Professor, CSIR (1967-79), etc

Dr Khatri's field-work in India included Anthropometric studies of Kulvis and Lahulies at Manali, Himachal Pradesh, Pleistocene deposits in Sindhu, Lidder and Jhelum river basins, Kashmir; Kangra Valley (around Dharmashala and Jwalamukhi), Fossil-bearing deposits in the Middle Siwalik formations exposed at Heritalyanagar in Sutluj catchments area, Himachal Pradesh; Fossil and Stone Age tool-bearing deposits in the Narmada basin in Hoshangabad and Jabalpur Distts. of Madhya Pradesh; Godavari basin in Andhra Pradesh, and Gambhiri basin in Rajasthan.

Dr. Khatri worked extensively in foreign countries as well, for example in the Dordogne and Vezere Valley in SW France, at the Upper Palaeolithic rock-shelter site of Abri Pataud at Les Eyzies, the Neanderthal cave of Ragordu near Lascaux Cave in France, American Indian Occupation site on the Snake River, near Pullman, USA; Rift Valley in Ethiopia, around Zuni Lake in Shoe Province and at Kolkolitti Hill, at Fossil Springs, Kharga and Dakhla Oasis in the Libyan desert of Egypt, Sahara and Algeria

Dr. A.P Khatri was the Member of various academic Societies, such as the Royal Anthropological Institute, London; British Prehistoric Society, Cambridge; Indian Science Congress Association, Lucknow and Indian Archaeological Society, New Delhi, the latter of which had conferred on him the Honorary Fellowship of the Society

He died on 17th November, 2004 and leaves behind one son and one daughter, besides his wife and a grandson.

Dr. S P. Gupta

PURĀTATTVA

Number 34 2003–2004

Editorial

Since the establishment of the Indian Archaeological Society in 1967, a number of interesting observations have been made in the pages of its annual bulletin, Puratattva, concerning the archaeological development in the country vis-a-vis the people of India and their socio-cultural systems in time and dimension. Archaeological discoveries, from the middle of the 18th century till the first half of the 20th century were mainly in the form of data collection, contributing to the study and evaluation of the subject. The scenario of pre-Wheelerian times was quite different and to a great extent conservative. However, Dilip K. Chakrabarty has aptly observed that "Indian Archaeology was not in its death-throes when Mortimer Wheeler arrived in 1944 to stay on as the Director General for four years, but his sense of archaeological planning and the excavation methods, based on his layer-oriented sense of stratigraphy, took Indian archaeology to a new level of scientific awareness. This helped in transition to modernity in the field of Indian Archaeology". The Archaeological Survey of India, which carried forward Wheeler's approach and techniques in archaeological researches as an academic discipline, provided leadership to the country by associating young scholars from the Indian Universities. The well-laid out policy of archaeological investigation was continued for carrying out excavations and explorations besides conservation of monuments by his immediate professional successors. This motivated the young and the old alike to usher in a new era compatible with global standards through the Survey as well as Universities and Academic Societies.

In the field of conservation, there is a new trend and every country wants its own Charter of Conservation, when the fact is that the Venice Charter, an internationally accepted document for the Conservation of Monuments and Sites – 1964 fulfills all the legislative safeguards. Australia formulated its own Burra Charter but it does not come into conflict with various International charters. Roland Silva, in 2003, advanced the need for a separate Conservation-Charter for Monuments and Sites of South and Southeast Asia keeping in view the SAARC countries for a Regional Charter adopted in 1987. This was on the lines of SEAMEO gathering invited by the UNESCO in Indonesia in 1980, where a parallel proposal was submitted to evolve their National Conservation Guidelines covering their Monuments and Sites rather than indulge in the broader requirements of a Regional Conservation Convention. Our Indian counterpart, the INTACH, also proposed in 2004 a National Policy for Heritage Conservation and Management, including legal framework and legislation We may add that although the Venice Charter has practically has a comprehensive legislative safeguard, there is still some scope for amendments in the form of additions in Heritage Conservation particularly with regard to regional monuments and sites in Asian Countries in the deep monsoon and arid areas. In this direction the Archaeological Survey of India and ICOMOS-INDIA could provide a leadership.

The present issue of *Puratattva*, as usual, carries articles, arranged chronologically, from pre-historic times down to the medieval period and of varied archaeological interests, viz. excavations of various Harappan sites, namely Juni Kuran in Gujarat, Bhirrana and Tarkhanewala Dera in Rajasthan, Sanauli and Siswania in U.P., as well as excavation of Early Historic site, such as Kopia. It also includes four papers presented in a regional seminar organised by the Lok Vigyan Kendra, Almora. They are included here on their request. Some select papers presented in our last Annual Conference as part of the proceedings of the Conference are also included.

The three projects sponsored by the Indian Council of Historical Research (ICHR) namely Atlas of the Indus-Saraswati Civilization, Methodology in Archaeological Research and Growth of Cities in India have been completed and their reports have been submitted to the ICHR. The first project, namely, Atlas of the Indus-Saraswati Civilization, was a gigantic task. Apart from its nine completed volumes, two more volumes are getting finalised for publication. This is the first work of its kind and we hope that it will receive a positive response from the scholars and the students.

The publication of this Bulletin was made possible due to the generous financial assistance from the Indian Council of Historical Research and the Archaeological Survey of India, Govt. of India. We are grateful to both these organizations. However, these organizations are not responsible for the views expressed by the contributors of articles, notes, and reviews to this volume; they are personal views. The Indian Archaeological Society is also in no way responsible for them.

We deeply mourn the sad demise of Prof. V.S. Pathak, former vice-chancellor of Gorakhpur University, who breathed his last at Gorakhpur on 19th December 2003.

Dr. A.P. Khatri, Honorary Fellow of our Society and a well-known prehistorian; who donated his entire personal collection of priceless antiquities of stone tools and fossils collected by him from many parts of the world, besides the Shiwaliks and Narmada basin to the Society, also passed away in the early hours of the 17th of November 2004.

The publication of this issue was possible due to the untiring efforts of Dr. S.P. Gupta, Chairman of the Indian Archaeological Society, who went through all the articles. A team of young Research Associates of the Society, Ms. Gency Choudhury, Shri Suresh Bomble and Shri Sandeep Kumar Rai coordinated the work of making the material press ready. They were helped by other Research Associate of the Society, Ms. Apeksha in the proof-reading. Shri Rakesh Dutta, Shri Lakhan Trivedi, Shri J.N. Khera and Shri Manoj Harbola prepared the typescript and Ms. Rajrani Sharma provided references for the articles. The credit goes to Shri Himanshu Joshi for generating computerised graphics. Shri Jassu Ram provided line drawings of pottery and the maps.

Thanks are due to Shrimati Anita Mehta of Aquarelle and members of her staff, particularly Ms. Swaraj Davra, for bringing out this issue in time inspite of all delays on our part.

K.N. Dikshit
K.S. Ramachandran

Human Baby Skull Fossil Within the Middle Pleistocene Ferricrete



P. RAJENDRAN[1], M.P. CHOUGAONKAR[2] AND C.S.P. IYER[3]

Introduction

Tamil Nadu on the south-east coast of India forms one of the important physiographical zones which has more potential for the palaeoenvironment, prehistory, and hominid fossil studies in India than many other regions. The region consists of Highlands and Lowlands with a vast coastal area. The Highlands include the hilly regions of the Western Ghats and their foothills on the western part while the Lowlands have laterites and lateritic soils with vast alluvial and sandy plains intersected by various east flowing seasonal and perennial rivers. Climatically the region comes under the semi-arid zone, and its floral and faunal stocks are mostly confined in Highlands on the west. The vast sea-coast on the east presents the characteristics of tropical, semi-arid to arid situations. North-east monsoon is one of the climate-determining factors of the region.

During an exploration in May 2000 in Villupuram district of Tamil Nadu, rich Stone Age cultural evidences were found at Odai in Bommayarpalayam. They were found mostly as surface finds, besides a few in stratified context. The implements are made of flakes from pebbly quartz raw material while a few are made of fossil wood. The implements are brick-red in color due to their association with the ferruginised sand. Along with the artifacts, split and cut semi-fossilized animal bones were also found in plenty. The nature of implements and their stratified occurrence indicates the existence of two different industries representing the Mesolithic and Upper Palaeolithic cultures, respectively, of the Holocene and Pleistocene periods.

Following the discovery of the prehistoric cultural evidences an excavation was conducted at the Odai site at an 8 m vertical section of colluvio - alluvial - aeolian sand deposits. Due to the vertical nature of the section, excavation was done in step-cutting to avoid the collapse of the section. During the excavation five layers of sand, and four layers of sand and gravel of varying thickness were identified within 5.75 m. At the top of the whitish sand no implement was found, while at a depth of 2.36 m., Mesolithic stone tools were seen in the sandy - gravel stratum. Further, at a depth of 4.5 m, in a layer of sand and gravel, Upper Palaeolithic implements made of stone and fossil wood were found. Along with the artifacts cut and split, animal bones were also obtained. At 5.75 m depth the thick fericrete stratum begins.

Away from the excavation site, on 14th October 2001 at 12.45 pm, a suspected fossil was discovered within the

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ferricrete which is devoid of any Stone Age implements. Here the ferricrete was earlier capped with 6m ferruginised colluvio-alluvial-aeolian deposits, and the PWD, with the bulldozer, had removed the whole deposit along with the underlying ferricrete of 2 m thickness. On that surface within a very small depression on the ferricrete a little difference in wrinkle nature, unlike on the surrounding, was observed. From its nature a strong suspicion was aroused which compelled the first author to use small needles and brushes to expose and identify whether there is a faunal fossil entombed within the matrix. On brushing, a very small hole on the wrinkled surface appeared which strengthened the suspicion on it as a fossilized human baby skull. It was, therefore, dug out along with the ferricrete for further study.

Hundreds of hominid fossils, ranging in date from a few lakhs to over four million years, are known from different parts of the world and most of them have been found in stratified context. However, none of them where been found within the hard ferricrete and, therefore, they could be retrieved without much damage. Now an entombed human fossil has been found, for the first time, within the ferricrete of the Pleistocene period.

Methodology

The normal procedure to tackle this sort of problem is to extract the fossils in its entirety from the matrix. This can be done chemically, by dissolving the matrix away to leave the fossil, or by dissolving the fossil away to leave a hole from which a latex cast can be made if the fossils and the matrix are chemically different, or physically, by digging the fossil out with fine needles or drills. In this case, none of these approaches was particularly useful, and, therefore, the entombed fossil was dug out along with the surrounding hard ferricrete for further study.

The next attempt was to explore the methodology in the study of the entombed fossil. Since no procedure was known to study such an entombed specimen, it was decided to image the fossil inside the nodule using technologies developed for medical scanning. Initial attempts were made with the X-ray Computed tomography (CT or CAT) at the Kumar Hospital in Kollam to see the presence of fossil inside the matrix. CT X-rays were passed into the specimen from 3600 and detected by a row of detectors in the opposite side. The difference in the density of the material is reflected as the difference in the intensity of X-rays. This difference is projected as an image by a complicated reconstruction algorithm. Thus an oval structure surrounded by the hard matrix has been well identified and it has confirmed the existence of a human fossil within it.

Then 2-D scanning methodology was carried out at the Travancore Scans in Kollam thereby Scanogram slice from above, AP scanogram with image planes, Cross-sectional images, and Lateral scanogram viewed from the side were obtained. These analyses have shown several human cranial features on various images.

However, the search continued since several parts on its full morphology and orientation remained inconclusive from the CT and 2-D images. At that time a piece of recent literature regarding the 3-D morphology reconstruction of the Herefordshire fossil was obtained from the Internet (Briggs and Crowther,2001). According to it, theoretically it is possible to image the fossils inside their nodules using technologies developed for medical scanning. Some of these include Magnetic Resonance Imaging (MRI), X-ray Computed Tomography (CT), and scanning 2-D and 3-D which are very expensive.

Even though the resolution of the current medical CT machine is relatively low, CT works by passing X-rays through the sample from many different angles, using different density, helps in locating the fossil inside the nodule. Two and three dimensional scanning of the specimen is the best for reconstructing the full morphology of the entombed fossil. Though these techniques are very expensive the morphological information obtained through the 3 D images are much more when compared to the 2-D ones.

At a 3-D scanning facility in the Upasana Hospital at Kollam, in order to extract all the cranial features of the fossil, the scanning in thin helical runs (3 mm x 4.5 mm) of the entire specimen on different planes was carried out and reconstructed at 2mm interval. Some of the important images of the skull include: 3-D minimum intensity projection image showing the frontal bone, orbital cavity, nasal bone, maxilla, mandible, parietal bone, sphenoidal fontanella, and occipital bone 3-D projection image showing the eye orbit, and nasal bone; axial 3-D maximum intensity projection image revealing ferricrete,

cranial bone, and brain tissue; basal image having nasal bone, posterior nasal aperture, foramen ovale, zygomatic arch, carotid canal, foramen magnum, and foramen lacerum; 3-D minimum intensity projection of the cerebral axial image showing frontal pole, and longitudinal tissue; axial 3-D maximum intensity projection image indicating the cranial bone, brain tissue and teeth within the maxilla and mandible; plane axial section showing the coronal suture, anterior fontanella, and sagittal suture.

Discussion and Conclusion

Based on the anatomical inferences drawn from several scanned images of the Odai specimen, it is clear that it is a well-preserved, fossilized, pediatric skull intact. Even the fossilized brain is seen in full as endocast in the brain case of 312cc, and the cranial bone measures 1-2 mm in thickness. Milk teeth, ten each, have been noted both within the maxilla and mandible. These characteristics along with the nature of the fontanella indicate the age of the baby below five months. The extraordinary state of preservation of the complete skull, with the fossilized brain inside the cranium, appears similar to that of the Taung fossil (Dart 1925). Integrated, multidisciplinary studies are required to unravel various factors which lead to the fossilization and preservation of the Odai Laterite baby skull. Studies elsewhere suggested that organic matter might be protected from degradation by the inorganic matrix (Hedges *et al.* 2000), and possibly the situation might have been the same at Odai. The studies conducted on the preservation of organic matter in terrestrial and marine contexts (Hatcher *et al.* 1983; De Leeuw *et al.* 1993; Hedges *et al.* 2000) may help to understandmore on the above factors.

Sample	Dose (Gy)	Th (ppm)	U (ppm)	K%	Dose rate (Gy/ka)	Age (ka)
Odai Ferricrete	260.3+/-47.6	9.55	2.53	0.08	1.57	166+/-30

Table 1 Thermoluminescence date of the Ferricrete from Odai

Based on certain images it is clear that the post-cranial part of the child is there *in situ*, and the presence of other hominid fossil within the ferricrete at Odai site cannot be ruled out. Hence this is one of the most potential hominid sites in India, perhaps in Asia. Above all the discovery of the Mesolithic industry of the early Holocene period and the Upper Palaeolithic industry of the late Pleistocene period in stratified context from Odai has greater importance in the studies of prehistory and palaeo-environment. It is pertinent to note that so far no Stone Age artifact have been found within the ferricrete at Odai.

The above studies have clearly indicated the existence of a fossilized human baby skull, probably along with the remaining part of the body within the ferricrete. The preservation of the fossilized brain within the cranium, which is entombed in the ferricrete, is of greater importance in the studies on Palaeoanthropology and Human evolution. Thus a unique state of preservation of the fossilised human remains within the ferricretised colluvial deposit of the Pleistocene period has come to light for the first time any where in the world. This evidence is strong enough to contradict a long held belief among the geologists that no organic matter remains within a deposit once it undergoes ferricretisation or lateritisation.

From the anatomical study, by Orthodontist Dr. Tijo Alex in Alleppy and Endodontist Dr. C.S. Soonu in Kollam.on the lateral view of the face, it has been found that nasion, gonion pogonian are almost in straight line which in fact shows the bimaxillary prognathism. The marked difference in the bimaxillary prognathism in this fossil skull has greater importance owing to its prominent nature even in its infancy. This is one of the characteristics noted among the adults in the early human evolutionary stage. It confirms that the human fossil from Odai belongs to an early one in the human evolutionary stage.

To find out an absolute chronology of the human fossil the ferricrete covers over t... skull has been subjected for Thermoluminescence dating. The dating has been done by Dr. M.P. Chougankar from the Bhaba Atomic Research Centre. He has extracted quartz from

the ferricrete and carried out the dose rate analysis using gross alpha technique with pairs circuit for Thorium and Uranium, and Atomic Absorption Spectrometry technique for Potassium (Table-I). Thus the chronology of the ferricrete has been calculated to 0.166 Ma which falls exactly in the Middle Pleistocene, and the same is applicable to the entombed human fossil Laterite Baby - thereby confirming the age of the fossil. The date proves that the fossil from Odai belongs to an early phase in the human evolutionary stage, and it is of the *Homo sapiens (archaic)* which had existed between the *Homo erectus* and the *Homo sapiens sapiens*.

Acknowledgments

I am indebted to the University Grants Commission for its continuous help and encouragement for doing full time research in Archaeology. I sincerely acknowledge the observations and suggestions made by Dr. G. Sujathan, Principal, Trivandrum Medical College, Dr.V.M.Kurshid, Prof of Anatomy, and other Doctors in Trivandrum Medical College in Kerala. My special thanks are due to Dr. R.Bharath Kumar, the former Radiologist, and the Radiographer Mr. Johnson Thundil Varghese of the Upasana Hospital in Kollam for the 3 D imaging. Thanks are to Mrs. Thomas Kunnical and George Kutty for successfully conducting the excavation. I acknowledge the help extended by the Archaeological Survey of India and Kerala University.

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The Neolithic Cultures of Northern India : An Ethno-Archaeological Study

MANOJ KUMAR

The purpose of this paper is to reconstruct the Neolithic way of life of Northern India, on the basis of tribal cultures. Both archaeological and ethnological data of this region point towards a specific cultural pattern, which is controlled by the ecology and environment of Western Himalayan region. Archaeological investigations conducted in Northern India demarcate three pockets of Neolithic occupational area -the Kashmir Valley, the Ladakh Valley and the Kangra Valley. The former appears to be the nucleus area, as good number of sites have been found on the Karewa plains while the later were perhaps camp sites with fewer settlements.

KASHMIR VALLEY

Among the large number of sites in Kashmir Valley only two–Burzahom and Gufkral–have been extensively excavated and provide coherent picture of the Neolithic society.

Burzahom

Burzahom (Lat. 34°10′ N ; Long 74°54′ E) is situated in the Srinagar district of Jammu and Kashmir state, at a distance of about 16 km north-east from Srinagar. It can be reached via Naseem and can also be approached through Shalimar garden The site was first brought to light in 1935 by the Yale-Cambridge expedition led by de Terra and Paterson They conducted small scale excavations near a menhir and collected some bones and stone tools (de Terra, H. & T. T Paterson, 1939) Later the site was excavated by the Archaeological Survey of India, from 1960 to 1971 under the supervision of T.N. Khazanchi. The following four Periods have been brought to light through the excavations at Burzahom: Period I and II -Neolithic Culture, Period III -Megalithic Culture and Period IV -Early Historic Culture.

The details about the thickness of occupational deposits are not available Since the detailed report of the site is not published as yet, the information given in brief below is based on the summary of Burzahom excavations.

Dating and Chronology

The seven ^{14}C dates available are based on half life value of 5730 years (Agrawal, D.P. & S. Kusumgar, 1974:66-68). These dates suggest the total Neolithic occupation at Burzahom was from circa 2500 B C to 1500 B.C. However, there does appear much difference between Periods I and II of Burzahom, as far as absolute dates are concerned.

Habitational Floors and Shelters

Two categories of shelters have been brought to light

Department of A I H C & Archaeology, Banaras Hindu University Varanasi

at Burzahom. These are pit and surface dwellings.

Period I: The main feature of this period is the evidence of dwelling-pits. Sixteen dwelling-pits, which were recovered, are circular and rectangular in plan (Ghosh, A. ed. 1989:87).

The evidence of storage pits is also reported which are found in close proximity to the dwelling pits. These pits were small and shallow with a diameter ranging from 60 to 90 cm. A few animal bones, bone tools and stones were found within these pits.

Period II: The residential pattern of Period II is characterized by surface dwellings. Now the dwelling pits of previous period were filled up and plastered with mud and thin coat of red ochre. This composition was used as floor. The houses were built of mud or mud bricks (*Indian Archaeology 1960-61 A Review*: 11). The evidence of successive floors, made of Karewa soils, was also found. The remains of a number of post-holes suggest that the floors were covered by thatched roof.

A few mud platforms with partition walls were also found. Hearths (both of clay and stone lined), querns, mullers were recovered from the dwelling area.

Stone Tools

Period I: The stone tools include axes with rounded butt, chisels, adzes, pounders, mace-heads, points, picks, hoes and awls. These tools were usually made on Himalayan trap, quartzite and slate.

Period II Apart from the tools of earlier period, some new types, such as harvesters with perforations, double-edged picks, were introduced. The tools of this period are more in number and better finished than those of Period I. The raw materials used for these tools are same as in the preceding Period. The important types are axes, wedges, chisels, adzes, hoes, perforated picks, mace-heads, pokers and harvesters.

Bone tools

Period I: The bone tool assemblage of this period is represented by harpoons, points (large and small), needles (with eye and without eye), arrowheads, harvesters, awls, polishers, scrapers, borers, daggers, chisels, etc.

Period II: All the tools of Period I were reported from this period but harpoons and harvesters are found quite frequently (Pande, B.M. 1970:28). The frequency of bone tools with better finishing increased.

Harpoons — (a) symmetrically carved barbs on both sides, (b) alternately carved barbs on both sides and, (c) barbs mostly on one side.

Points — (a) sharp and projected point, (b) sharp point with rounded and flattened body, (c) points with grounded butt and (d) pen shaped point, with a groove for hafting

Scrapers — (a) heavy, horntip, sharpened and burnished, (b) medium size, used for polishing long bone and (c) thin, flat and light.

Arrowheads — (a) shouldered and (b) rounded.

In Period I the occurrence of high percentage of harpoons, spearheads, arrowheads, daggers indicates that the people of this period were mostly dependent on hunting and fishing. On the other hand, the presence of picks, hoes, harvesters suggests that they had also some knowledge of agriculture.

Pottery

The Neolithic pottery of Burzahom may be broadly divided in two categories -Grey Ware and Burnished Ware. Both the wares are handmade (*Indian Archaeology 1961-62 – A Review* :12).

Other Objects

A few metal objects have been found but only from the upper levels of Period II. These include a few copper arrowheads and a coil (*Indian Archaeology 1964-65 – A Review* 13).

Plant Remains

Although, the direct evidence for plant remains has not been found so far in regular excavations, yet some

soil tests of different strata have thrown light on it. The soil samples of Period I and II were examined and the plant remains discovered. They belong to the wild and cultivated variety of wheat, barley and lentil (Buth, G.M. & R.N. Kaw 1985:109-113). The barley husks were also used as tempering material in pot-manufacturing. Impressions of barley grains were also recovered from plastered floors and mud bricks. The following species of different cereals have been identified:

Wheat ——*Triticum compactum, T. sphaerococcum*
Barley ——*Hordeum vulgare (belongs to six row species).*
Weed seed——*Medicago species.*

On the basis of palynological studies from Haigam Lake in Kashmir Valley, Vishnu-Mittre has suggested that there were three stages of disturbance of natural vegetation caused by decline of pine forest (Vishnu-Mittre, 1979). The discovery of the seeds of *Lithospermum arvense, Medicago denticulata, Lotus corniculatus*, Ipomoea species from Burzahom indicates that the cultivation of wheat and barley was common.

Animal Remains

On the basis of the analysis of bone tools and bones recovered from burial pits evidence of following species of animals have been reported (Naseem, M. 1982:153).

Period I		
Pig	--	*Sus scrofa*
Wager (Kashmiri stag)		*Hanglu cervus-Elaphus*
Nilgai	--	*Elaphus traqu camelus*
Dog (domesticated variety)	--	*Cannis famiharies*
Sheep (domesticated variety)	--	*Ovis or ientalis*
Period II		
Wolf	--	*Cannis lupus*
Humped cattle (domesticated)	--	*Bos indicus*
Goat (domesticated)	--	*Capra hircus*
Buffalo (domesticated)	--	*Bubalus bubalis*

The remains of wild dog, Himalayan Ibex and Kashmiri stag *cervus duvaceli* have also been reported from the animal burials (Sharma, A.K 1968 : 42).

Disposal of the dead

One of the most remarkable features of Neolithic Burzahom is the burial practices. Both human and animal burials have been reported from Period II. Period I has not yielded any evidence for human or animal burial. In all, 14 burials have been found in which 9 are human burials and 5 are animal burials. (Sharma, A.K. 1967:239-42). All these burials have been located within the habitational area, mostly inside the houses.

Art Activity

The evidence of art activities of the Neolithic people at Burzahom is represented by two engraved stone slabs. These stone slabs were part of a single rectangular piece belonging to the upper levels of Period II *(Indian Archaeology 1965-66 –A Review* 19). The first stone slab is engraved with a hunting scene, while the other shows an incomplete pattern (Pande, B.M. 1971).

Gufkral

The site of Gufkral (Lat 35°54′ N; Long 75° 60′ E) is situated at a distance of about 41 km south-east of Srinagar in Tral tehsil in Pulumawa district of Jammu and Kashmir state. It can be approached by Awantipur - Dodsar - Tral road. The site was explored by a team of Archaeological Survey of India in 1961-62 *(Indian Archaeology 1962-63–A Review* : 9). Later, it was excavated under the supervision of A.K. Sharma during the year 1981-82 *(Indian Archaeology 1981-82–A Review* 19-25 ; Sharma, A. K. 1991 ; Sharma A.K. 1998a).

The habitational deposits of Period IA Aceramic Neolithic was 1.10 m, followed by Period IB (Early Neolithic) deposit of 40 cm, and Period IC (Late Neolithic) of 70-75 cm and Late Neolithic *(Indian Archaeology 1981-82-A Review 19)*

Dating and Chronology

The following ^{14}C dates of the different periods of the Neolithic Culture have been given by Birbal Sahni Institute of Palaeobotany, Lucknow All the dates are

based on the half–life value of 5730+40 years and are reported in *Indian Archaeology 1981-82 – A Review*

On the basis of calibrated and uncalibrated dates A.K. Sharma has suggested the following time–brackets for the three stages of Neolithic at Gufkral (Sharma, A.K. 1998a:6).

	Calibrated	Uncalibrated
Period IA	2787-2350 B.C.	2420-2000 B.C.
Period IB	2347-2000 B.C.	2000-1700 B.C.
Period IC	2000-1850 B.C.	1700-1550 B.C.

Habitational Floors and Shelters

Two distinct categories of shelters have come to light from the Neolithic deposits of Gufkral. Similar to Burzahom, these occur in chronological sequence – pit-dwellings followed by ground shelters.

Stone Tools

Period IA The stone tools of Aceramic Neolithic Period include finished and unfinished celts, ring-stones, pounders, pestles, points, etc. Two adze shaped celts made of Himalayan shale were also found in which one is painted with red ochre. The other types reported are three scrapers, and a few points having both sharpened ends. A large sized quern with traces of red ochre on working surface was recovered from the floor near dwelling-pit. Amongst these tools, the ring-stones, pounders and querns are made on sandstone, while the rest of the artefacts are made on Himalayan trap.

Period IB In this period almost all tools of the earlier period continued but stone points become scarce.

Period IC This period is marked by a new type of tools, double holed harvester The sides of the harvesters were rounded. Stone points, which were scarce in Period IB, make their appearance again in good numbers The tools of earlier periods continued without any marked change.

Bone tools

Period IA In all 42 bone tools were reported in which more than half were points and arrowheads (Sharma, A.K. 1991:103) Other recognized tools were awls, needles, scrapers, long borers, harpoons and splinters made on long bones. Micro bone-points were also found in good numbers.

Period IB The tools recovered from Period IB include simple points, double end points, awls, pierce-cum-scrapers, arrowheads. Pierce-cum-scrapers were usually shaped out of splinters and spatula. As compared to earlier period, the bone tools recovered from this period are fewer in number.

Period IC. In this period the bone tools were found in large number and most of them were polished points. Besides, bone handles appear for the first time, which were mostly shaped out of radius, tibia or tarsal bones of sheep and goat. A new type of arrowhead with tanged butt is also noteworthy from this period. Single sided barbed harpoons were shaped both on bone and stone.

Pottery

Period IB Pottery made its appearance for the first time in Period IB. The important wares of this period were Coarse Grey Ware, Dull Red Ware, Black Burnished Ware and Grey Burnished Ware. The potsherds belong to Coarse Grey Ware found in maximum number. All the Wares are handmade.

Period IC. The pottery of Period IC also corresponds with the pottery of earlier phase of Gufkral as the main ceramic types were Grey Ware, Dull Red Ware, Grey Burnished Ware and Black Burnished Ware. But the posherds of Red Gritty Ware mark the prevalence of a new type. Besides these, wheel-made pottery made its appearance in the form of Black Burnished Ware in this period. A few sherds with graffiti marks have also been found. On the wheelmade Black Burnished pot, a knobbed design is made on the neck portion.

Miscellaneous Objects

Period IA The group of miscellaneous objects from Period IA included the following items (*Indian Archaeology 1981-82 A Review* 20; Sharma, A.K. 1998:15).

Beads Cylindrical and barrel shaped of steatite (2), and highly polished spacer (1), Terracotta marble.

Period IB: The finds from this period are comparatively restricted (Sharma, A.K.1998 a: 9).

Beads: Circular, made out of Carnelian (1), and barrel shaped made out of stone (1).

Period IC: This Period has yielded a number of miscellaneous artifacts (Sharma, A.K. 1998 a : 10-11) Terracotta bangles with triangular cross-section, cowrie shells, carnelian beads, a 'comma' or 'tiger's nail' shaped pendant, made of light green jade, having pointed end and straight flat top which is pierced.
Potsherds with graffiti marks: A Grey Ware sherd having straw and reed impressions and incised with one vertical and two oblique strokes; copper hairpin(7.5 cm long) with flattened coil head, and a copper antimony rod and spindle whorls made of stone.

Plant Remains

Evidence of grains have been retrieved through floatation technique at Gufkral, which provides significant pattern of cereal consumption during the Neolithic times in the Kashmir Valley. These remains are of much value, since from no other site of the region physical remains of grains could be obtained.

Animal Remains

Similar to the evidence of farming of cereals the osteological remains at Gufkral also provide an interesting tendency of animal food consumption and pastoralism.

The analysis of the total bone assemblage of Gufkral suggests that the animals like cattle, bos, sheep, goat, red deer and Himalayan ibex, of all age and sex were killed during Period IA indicating hunting based subsistence. But from Period IB mainly young and male animals were killed which may be due the herding or pastoral activities (Sharma, A.K.1980-81: 31-36).

THE LADAKH VALLEY

The area of Ladakh Valley has yielded only a few sites of which Kiari and Gaik have been excavated on small scale.

Kiari

The site at Kiari (33°45′ N ; 78°05′ E) is located on the left bank terrace of Indus river in Ladakh at an altitude of about 3900 m from mean sea level. A small scale excavation was conducted in 1989 (Ota, S.B. 1993). In this area few habitations are located on flat terrace surface, where patches of suitable lands are available for cultivation. The human occupation at this site is evident by the evidence of fire-places, faunal remains, potsherds and stone objects. These have been ascertained to represent three successive occupations at the site. A few potsherds and charred animal bones were found in association with these fire-places. The occurrence of big sized charcoal pieces indicates the use of branches or trunks of trees and large bushes. This also indicates that the vegetational cover during the Neolithic Period was thicker than it is today. Besides, remains of at least five other fire-places in the form of isolated charcoal patches at different heights were discovered which suggests repeated occupation of the site.

Only three potsherds of Red Ware with light brown, slip have been recovered, which are handmade, well fired and of medium fabric. One sherd is of rim portion of high-necked vase. These sherds bear techno-typological similarity with the earthen pots of Period II of Burzahom (*Indian Archaeology 1961-62–A Review*, 19). Stone objects include saddle querns, pestles and burnishers.

The animal bones from the site included *Bos* species 4%, *Capra* 27%, *Capra/Ovis* 5%, *Nemorhaedus goral* 2%, Rodent 3%, small ruminants 57%. (Ota, S.B. 1993:103). Bseides, the bones of higher primate (1%) and bird (1%) have also been reported. On the basis of the morphological features of bones of *Bos* species, *Capra*, *Capra/Ovis* and small ruminants, it appears that these animals were inhabitants of high altitudes. It is also noteworthy that *Bos*, *Capra* and *Capra/Ovis* are of domesticated variety. The faunal assemblage suggests a sort of pastoral based economy, which may be partially supported by hunting of small ruminants, and gathering of fruits and roots.

Gaik

The site of Gaik (33°30′ N , 78°10′ E) is situated on the right bank terrace of the river Indus. This is also

excavated by S.B. Ota. During the trial digging, evidence of only a hearth was recovered (Ota, S.B. 1993:105). It seems that its cultural remains are similar to that of Kiari.

Dating and Chronology

Three ^{14}C dates are available from Kiari - PRL 1400 - 2890 ± 160 B.P.; PRL 1401 – 2830 ± 120 B.P. and PRL 1402 – 2770 ± 120 B.P. These dates push the antiquity of human occupation at Kiari to about 900 B.C. The noteworthy aspect of these dates is their consistency from bottom to top corroborating very well with successive human activity. On the basis of ^{14}C dates from Gaik a suggested time-bracket for both sites is ranging from 4700 B.C. to 900 B.C. (Ota, S.B. 1993:105). These dates are also confirmed by the stratigraphical position of sites - Kiari lies comparatively at a higher elevation than Gaik, although both the sites are associated with the Holocene terrace. Therefore, it can be said that the human occupation at Gaik is older than of Kiari.

The Kangra Valley (Himachal Pradesh)

In Himachal Pradesh the Neolithic sites have been reported mainly from Kangra district. The sites are Ror, Dera-Gopipur, Baroli, Basawal, Baddi, etc. (Mohapatra, G.C. 1979:59-62).Most of the sites are situated on the terrace at the average height of 400 to 650 m from the mean sea level, along the Beas in the valley of Kangra and in the dun between Pinjore and Nalagarh. None of the sites has been excavated and most of the tools were reported from Ror. Other sites have yielded only two or three tools. The tool types are axes, chisels, picks, axe-hammers and ring stones. Some of the axes from Ror show close resemblance with those found at Burzahom (Mohapatra, G.C. 1979:63). It is significant that the collection has yielded neither unfinished celts nor any waste flakes and chips. It suggests that the tools were not manufactured at the sites.

The above accounts of the archaeological remains of North India provide almost complete sequence of Neolithic Culture The evidence unearthed from Burzahom and Gufkral of the Kashmir Valley represents the base camp habitations, while the sites of Ladakh Valley and Kangra Valley appear to be the seasonal migration camps It is the group of the Kashmir Valley sites where three distinct stages of Neolithic subsistence could be ascertained. These are: Aceramic Neolithic; Early Ceramic Neolithic; and Late Neolithic.

ETHNOGRAPHIC EVIDENCE

Northern India is mainly represented by the transhumance based pastoral tribes. In fact there are hardly any pure pastoral groups in existence. However, we may briefly describe the cultural aspects of the tribes who are predominantly pastoral. The subsistence and economy of these tribes is based primarily on animal breeding. Agriculture is also practiced as subordinate mode of subsistence. The reason for restricted cultivation is not so much the lack of technological know–how, but is due to their habitat, which discourages crop raising. Therefore, pastoralism and transhumance are the only alternative for exploiting the mountainous resources by these groups. Two tribal groups Gujjar-Bakarwal and Gaddi were found most relevant for the present study.

Gujjar - Bakarwal

The Gujjar-Bakarwals are mainly concentrated in the districts of Poonch, Rajauri and parts of Jammu, Udhampur and Kathua. Their concentration is also found in Kellar, Wagnat Valley, Noorbad and Charar-e-sharif belt (Maiti, S. 1992:344). Their physical features are characterized by narrow forehead, thick eyebrow with lighter eyes, highly curved nose and narrow chin.

Subsistence and Economy

The subsistence of the Gujjar-Bakarwals is completely based on pastoralism although, they also practice farming in very limited scale. The availability and utilization of extensive natural pastures, which are seasonal in nature, control their pastoral activities. Throughout the year they exploit these pastures, which are situated at different altitudes. Entire activity of the Gujjar-Bakarwals revolves around pastures, which are of three types (Khatna, R.P. 1992:49). The winter season grazing area, intervening pastures (located between the region of winter and summer camp, covering the middle mountain ranges and valleys) and summer pasture.

The areas of winter pasture are located in low altitude regions of Shiwalik hills (below 1200 m). These pastures are utilized from November to March. During the

pasturing, the movement of the Gujjar-Bakarwals extends from 8 to 16 km around their camps. In case of suitable patch of land they also practice agriculture in very restricted amount, around the settlement. Intervening pastures are used during the migration, both upward and downward. On their way when they stay for 15 to 20 days, they perform little agricultural activities. At the time of upward journey to summer camps they sow the available patches of suitable land and during the downward journey, these fields are harvested. The areas of summer camps are situated at high altitude and remain under snow during winter, but in summer it provides a better environment. After snow melting, several types of nutritious grasses sprout which are the main source of pasturage.

Settlement Pattern

The settlement pattern of the Gujjar-Bakarwals is characterized by winter and summer camps, where they spend about nine months in a year. They establish their settlements in those areas where abundant pastures are available.

Winter Camps. The winter camps are actually the base camps of the Gujjar-Bakarwals and are located on the Shiwalik hills or Outer Himalayas, at an altitude of 610 m from mean sea level (Khatna, R.P. 1992:57). From November to March they stay in these camps. Their huts are situated on the slopes of the hills in dispersed manner. Now-a-days many Gujjar-Bakarwals have constructed pucca houses, known as Kotha.

Summer Camps: The summer camps are located on the Greater Himalayan mountains, at the height of 3050 to 4570 m above the sea level (Khatna, R.P. 1992:147). Some of the major areas are Naushera, Gurej, Dras, Maru and Sonmarg. These are situated in the north, north-west and north-east of Kashmir Valley. The summer camps are used for about four months, from June to September. Here, at a certain place they erect their dwelling, which is known as 'dhara'. The dharas are built of stones, against an overhanging rock on the mountain flanks or on flat space available on the ridge (Khatna, R.P. 1992:146). Stone pens are made for the lambs and kids.

Migration The migration takes about 70 days in which 25 days are journey days and the rest are halt days (Khatna, R.P. 1992:85). During upward and downward migrations on route, are found temporary camp stations (Khatna, R.P. 1992:142). These camp stations also are generally suitable for their flocks. The camping sites are usually located near water sources, grazing ground and away from the settlement.

Social Pattern

The main objective of social structuring is to maintain the territorial organization and nomadic mode of life, for which though a number of groups and sub-groups exist in the social structure of the Bakarwals, yet at the base only two main sections -Kinship group and Functional group are identifiable (Khatna, R.P. 1996:304).

The Gujjar-Bakarwals follow the patrilineal system. In general, they are monogamous, but due to the influence of Islam, endogamous and exogamous marriages are practiced. Marriages generally take place in their summer camps.

The Gaddi People

The Gaddi, a transhumant tribe, live primarily in Bharmour tehsil of Chamba district in Himachal Pradesh. They also occupy certain parts of Jammu and Kashmir, Punjab, Western Uttar Pradesh and can be divided into two groups (Bose, S. 1963:191) :

1. Muslim Gaddis are found generally in the plains of Punjab and Western U.P. or Uttaranchal.

2. Hill Gaddis are inhabitants of the northern Himachal Pradesh and southern parts of Jammu and Kashmir. Their territorial distribution is mostly confined to the Western Himalayan region.

In fact Gaddi is generic term which includes Brahmans, Rajputs, Khatris, Rathi, etc., and are pastoral community. They are indigenous populations of Bharmaur but have spread southward across the Dhauladhar (Rose, H.A. 1991:256).

Subsistence and Economy

The subsistence and economy of the Gaddis are

based on pastoralism and agriculture. In high altitude villages like Jhikli Kugti (8500-10250 feet) pastoralism dominates over agriculture (Bose, S. 1963:211).

Pastoralism: Pastoralism has been the traditional occupation for the Gaddis and is based on the herds of sheep and goats. Pastoralism is so important for them that even their wealth is measured by the number of sheep they possess. From this source they obtained wool and additional food in the form of milk and meat. The Gaddis also keep bulls and cows (Bhasin, V. 1988:155). These animals support agriculture to a major extent.

Grazing pattern usually is marked by 400 sheep and goats belonging to three or four families. These numbers of animals make one grazing unit and one member of each family constitute a grazier unit (Bose, S. 1963:200). If a man has large number of sheep and goats he also hires shepherds. Along with shepherds dogs also guard the herds during grazing.

Migration: The Gaddis practise winter and summer migration. During the winter season, due to severe cold and snowfall in the month of November, and disuse of pasturing, they migrate with flocks to the lower regions or plains like Kangra, Nurpur and Pathankot. A Few members of family, especially old persons are left behind to look after the cattle and fields. In these areas they also sell their wool and woollen products. In the month of March they start upward journey for their permanent homes Since they do not keep any tent with them they sleep under the open sky. In bad weather they use rock shelters or shadow of a tree for halting. Sometimes they lie among their sheeps and goats (Bhasin, V. 1988:162).

Settlement Pattern

The villages of the Gaddis are situated on the slopes of the mountains, between 4000 to 9000 feet (about 1335-3000 m) from sea level (Bose, S. 1963:191). In accordance with the suitable land, individual or cluster of villages can be found, but the tendency of the Gaddis habitation is that of dense cluster (Bhasin, V. 1988:103). Only in case of scarcity of suitable stretch of land, dispersed settlements are found.

Social Pattern

Both joint extended family and nuclear type of family systems are prevalent among the Gaddi society. The Gaddis family and kinship are based on patriarchal system. They are basically monogamous, but few instances of polygamy is also present in those families where the first wife had failed to produce a male issue (Sarkar, V. 1996:263). If a father has one wife, the property is equally distributed between the sons, but in the case of more than one wife, each wife gets equal share which is then equaly distributed among sons.

Emergent Picture

The archaeological remains of the North-western region, evidence first distinct occupation of this hilly region during Neolithic Period. The available Carbon-14 dates from the earliest Neolithic horizon at Gufkral date back this event to circa third millennium B.C. It may further be noted that till today, no distinct Mesolithic horizon has been discovered in this region. Local origin of the Neolithic, from a preceding hunting-gathering stage, is not testified in North-western India. It is interesting to note that this trend is also in correspondence with the tribal account of the region. For, there is not a single tribe of the Northern India, which is recorded to be in hunting-gathering state. It may be reasonable to presume that the first extensive occupation of the hills of north in general and Kashmir Valley in particular was made by the pastoral and food-producing communities, who were immigrants from other region.

Two tribes- the Gujjar-Bakarwals and the Gaddis–were identified as representing the pastoral-cum-incipient farmers of the North-western India. Both of these tribes are transhumant. The basic pattern of their culture is governed by seasonal migration for pastures. As a result of which, their settlements are divided into two parts the base camps are comparatively permanent in nature, while the pastoral camps are of short-duration habitat with temporary arrangements for food and shelter.

The available Neolithic remains of Kashmir Valley clearly indicate that during the beginning of the third millennium B.C this area was occupied by the Neolithic communities and for about 1500 years their culture

developed through three main stages. Absence of evidence of the antecedent stage clearly suggests that they were immigrants to this region. After establishing in Kashmir Valley the Neolithic communities have established multi-directional contacts with contemporary cultures. The main reason behind this was perhaps their pastoral activities. It may be mentioned that the intrusive items, such as copper pins, beads of semi-precious stones, pendants, etc. were reported mainly from Late Neolithic stage, when pastoralism had been fully established. The ethnographic accounts and marginal agriculture also suggest that the pastoral communities frequently make interaction with other communities during seasonal migration and obtain many necessary as well as luxury items, which are not part of their culture. A case in point is the Kot Diji vase (3000 B.C.) with carnelian beads found at Burzahan. A similar situation may be presumed for the Neolithic Period also. A number of Neolithic sites were reported along the ancient routes of Srinagar-Leh and Srinagar-Baramulla highway (Shali, S.L.1993:61). It indicates, that these routes might have been used by the pastoral nomads during the Neolithic Period.

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The Ṛigvedic Flora and Fauna: What Light Do These Throw on The 'Aryan Invasion' Debate ?

B.B. LAL*

For more than a century now it is being orchestrated that the Aryans came to India from outside, more specifically from Central Asia. Amongst the various reasons that are advanced to uphold this view is one which relates to the names of trees in the Indo-European languages. It has been stated that these names include certain species which pertain to cold climate and since India is a country of hot climate these trees must take us to a cold-climate area in search for the 'original home'. Although most of the theories about the 'original home' have been challenged from time to time, yet the old (and outdated) argument based on the names of certain cold-climate trees seems to retain its deep imprint on many scholars who are otherwise prone to an analytical thinking. For example, Possehl (1996: 65) still holds as follows:

"There has been a great deal written about Aryans and Indo-Europeans, much of which is either confused or confusing. Even recent books on these peoples, while they receive much attention, can be old fashioned (e.g., Renfrew 1987). One thing seems certain, the speakers of Vedic Sanskrit are the earliest well documented [italics in the original] speakers of an Indo-European language in the subcontinent, and they came from elsewhere. This conclusion comes from a number of sources, the two most important of which are: (1) their books, which tell us that they were in new lands filled with non-Aryan peoples and (2) Indo-European words for trees which are species such as birch, Scotch pine, linden, alder and oak. These are plants from a temperate environment and the fact that their names are shared among the early languages of the family suggests a homeland in this environment (Friedrich 1970, especially pages 152-158)".

To begin with, for a very long time the term 'Aryan' has been taken to signify a 'race', but now it is being progressively realized that it has more to do with a family of languages rather than a race. With this much of explanation, let us come back to the subject of our discusion.

I do not propose to discuss here Possehl's first assertion, viz. 'their books [by which he evidently means the books of the Indo-Aryans], which tell us that they were in new lands filled with non-Aryan peoples'. This aspect has already been dealt with in detail in my book, *The Sarasvatī Flows On*. However, it is his second statement, viz. about the cold-climate trees, that is the subject-matter of this Note. Just to put my findings in a nutshell: there is ample evidence to show that: (1) the earliest known book of the Aryans, viz. the Ṛigveda, does not mention any of the species of cold-climate trees so confidently enumerated by Possehl, and (2) on the other hand, all the species of trees mentioned in this earliest text of the Aryans belong *not to a cold climate but to a tropical*

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one. The provenance of these trees does not go west of Afghanistan and is by and large confined to what are now India, Pakistan and Bangladesh, with a spill over to Sri Lanka, Myanmar and a bit further to the east. These data completely knock the bottom out of the cold-climate thesis for the 'original home' of the Aryans.

The same is the case with the Ṛigvedic fauna. The occurrence in this earliest text of the Aryans of names of such species as the lion, camel, elephant and peacock, which essentially belong to a tropical and sub-tropical climate, and the total absence of any species specifically of the cold regions in the Ṛigvedic list clearly show, once again, that the 'cold-climate home' thesis for the Vedic Aryans is baseless.

To substantiate what has been just stated, we give below some details about the various kinds of trees mentioned in the *Ṛigveda*.

Aśvattha (*Ficus religiosa* L)

As gleaned from ***RV* 1.135.8,** the wood of the ***Aśvattha*** was used for making vessels that would hold the Soma. It is also learnt from a later text, the *Atharvaveda* ***(AV 6.11.1)***, that its sticks were used in kindling sacrificial fire: it is, thus, not unlikely that the same may have been the practice during the Ṛigvedic times. All this shows that the tree was well known to the Ṛigvedic people who used it for their everyday needs. The area of its occurrence is **eastern Afghanistan, Pakistan, India, Sri Lanka and Myanmar.**

Kiṁśuka / Parṇa (Butea monosperma (Lamk.) Taub., Syn. Butea frondosa Roxb. / Butea superba Roxb.)

According to ***RV*10.85.20,** the ***Kiṁśuka*** wood, along with that of *Śalmali (Salmalia malabarica)*, was used for making chariots. This tree **is found in India, Pakistan, Bangla Desh and Sri Lanka.**

Khadira (Acacia catechu)

Being fairly strong, the ***Khadira*** wood was also used for making chariots (***RV*** **3.53.19).** It is **limited to India, Pakistan and Myanmar**.

Nyagrodha (***Ficus benghalensis*** L.)

Although not mentioned specifically by its name, this tree seems to have been implied in verse **1.24.7** of the Ṛigveda. It is met with in India, eastern Afghanistan, Pakistan and Sri Lanka.

Vibhī-daka/Vibhī-taka (Terminalia bellerica **Roxb.)**

It is gathered from ***RV*****7.86.6** that the nuts of this tree were used for dicing. The tree is at home in **Pakistan, India, Sri Lanka, Myanmar and maybe found as far east as Malaysia.**

Śalmali (Salmalia malabarica)

The wood of this tree also was used in the construction of chariots **(RV 10.85.20).** Its main region of occurrence is **Pakistan, India, Sri Lanka, Myanmar, but one may come across it even in Indonesia.**

Siṁśapā- (Dalbergia sisso)

Because of its sturdiness, the wood of this tree was also used in chariots (***RV*** **3.53.19).** Its provenance is **India, Pakistan and Afghanistan.** The small region of south-eastern Iran, where too one may come across it, may, for all intent and purposes, be regarded as an extension from Afghanistan.

From the foregoing it would be clear that most of these trees belong to the Indian subcontinent, with a spill over to Afghanistan on the one hand and (sometimes) to what is known as South-east Asia on the other

Turning our attention to plants and grasses, the position may be summarized as follows:

Urvāruka (***Cucumis melo*** **L. var.** ***utilissimus*** **Roxb. Duthie et Fuller)**

In the Ṛigvedic hymn concerned **(7.59.12)**, this plant is mentioned in a philosophic context. The devotees prayer is that he/she may be freed from the bondage of death just as the ***urvāruka fruit***, as soon as it is ripe, is released from the plant itself; and he/she may be granted immortality. **Growing wild in India, Pakistan and tropical**

Africa, it is cultivated, besides these countries, in Afghanistan, Iran, Malaysia and even north Australia.

Darbha (Imperata cylindrica (L.) P. Beauv. - Syn. *Saccharum cylindricum* (L.) Lamk., etc.)

Since the word ***darbha*** occurs in the Ṛigvedic verse (***RV*** **1.191.3)** along with other grasses, it is evident that it belonged to that category. However, its exact Latin equivalent is not very certain. At the same time, the context indicates that these grasses **grew luxuriantly in wilderness, sheltering poisonous reptiles. A hot and humid climatic zone is thus indicated.**

Pākadūrvā (*Cynodon* dactylon (L.) Pers. - syn. *Panicum dactylon* L., *Digitaria dactylon* (L) Scop.)

Along with two other grasses, viz. *kiyāmbu* and vyalkaśā (which unfortunately we have not been able to identify), the ***Pākadūrvā*** is stated in ***RV*** **10.16.13** to grow in areas where the dead body is cremated. Its provenance is **Pakistan, India, Sri Lanka and Myanmar.**

Muñja (*Saccharum bengalense* Retz., *Syn. S. Munja* Roxb. etc.)

It is referred to in the *Ṛigveda* in two different contexts. In ***RV*** **1.191.3** it is stated that venomous creatures inhabit the area where this grass grows, along with a few others, such as **sairya** and **viraṇa** which, we regret we have not been able to identify. ***RV*** **1.161.8** mentions the use of ***muñja*** in the filtering of the Soma. It grows in ***Afghanistan, Pakistan, India, Bangladesh and even in some parts of China.***

Śipāla (Blyxa octandra Planch. - Syn. *B. Roxburghii* Rich. etc.)

Referred to in ***RV*** **10.68.5,** this plant grows in still water, such as in tanks or small lakes. It grows in the **tropical regions of Asia and Australia.**

Soma (Species of *Sarcostemma ? / Ephedra ?*)

This plant is very much eulogized in the *Ṛigveda*, so much so that a whole **Maṇḍala (viz. 9)** is devoted to it. Its juice was offered to gods in rituals. Although it has not been possible to identify this plant with certainty, from all accounts it seems to have grown in the **hills between the north-western part of the Indian subcontinent and Afghanistan.**

As would have been clear from the foregoing, on the one hand all the Ṛigvedic trees and plants belong to a tropical environment and, on the other, none of the five 'temperate-environment' tress mentioned by Possehl, viz. birch, Scotch pine, linden, alder and oak, finds a mention in the *Ṛigveda. The Ṛigvedic flora does not reflect memory of such trees*. Then how, on the basis the aforementioned five trees, can the theory that the Ṛigvedic Aryans 'came from elsewhere' be sustained ?

And here it may be well worth while to add that even if trees such as the birch *(bhurja)*, pine *(chīra)* and cedar *(devadāru)*, which belong to a temperate climate, were mentioned in the *Ṛigveda*, that would have been no basis to argue that the Ṛigvedic people came from outside. These trees are met with also in the mountainous regions of north-western parts of the Indian subcontinent-which was the home of the Ṛigvedic people, as clearly revealed by the famous *Nadi-stuti Sukta* of the Rigveda **(*RV* 10.75. 5-6)**: it defines their habitat as from the Gaṅgā-Yamunā on the east to the Indus, along with its north-western tributaries, on the west. In fact, *RV* 10.121.4 even refers to snow-clad mountains, if not actually to the Himalayas themselves.

And if we care to have a look at the archaeological evidence, it also shows that as early as the third millennium BCE the Indians were exploiting the Himalayan flora. For wasn't the shroud/lid of a coffin in one of the graves at Harappa of deodar (*Cedrus deodara*) which grows in the Himalayan region (Choudhury and Ghosh 1951) ? And now it is a duly established fact that the Harappans, whose ancestry goes back to the fourth-fifth millennia BC, had nothing to do, in terms of their origin, either with Central or Western Asia.

We may now turn our attention to the **animals** in the *Ṛigveda*.

Uṣṭra (Camel, *Camelus dromedarius* and *Camelus bactrianus)*

There are about **half-a-dozen verses in the *Ṛigveda*** in

which the word uṣtra occurs. One of these (***RV*** **8.5.37**) refers to the gift of a hundred camels, while in another (RV 8.6.48) it is stated that these were yoked in fours. There are two species of the camel. One, having a single hump and known as ***Camelus dromedarius,*** is found **from India on the east to Arabia on the west,** whereas the other species, with two humps and called ***Camelus bactrianus,*** inhabits **Afghanistan, Mangolia and even parts of China.** In the *Ṛigveda*, however, there is no specific mention about the number of humps.

Gaura (*Bos gaurus*)

Both ***Gaura,*** the male, and ***Gaurī,*** the female, have been referred to in the ***Ṛigveda:*** the former in about half-a-dozen verses (e g. ***RV*** **4.21.8; 7.69.6)** and the latter in at least three (e.g. ***RV*** **1.84.10).** Though Griffith has mistranslated the word, sometimes as 'stag' and at others as 'buffalo', the correct identification is ***Bos gaurus.*** Heavily built and characterized by a prominent ridge above the shoulder, this animal is found in **India, Nepal, Myanmar, Thailand, Malaysia and even parts of China.**

Mahiṣa (Water buffalo, *Bubalus arnee/Bubalus bubalis)*

In the *Ṛigveda* the ***mahiṣa*** (domesticated = ***bubalus bubalis)*** is mentioned in a number of verses, such as ***RV*** **5.29.7; 9.87.7.** When the wild form ***(Bubalus arnee)*** is intended, the word ***mahiṣa*** is accompanied by the term ***mṛiga,*** for example in ***RV*** **9.92.6; 10.123.4.** Though the buffalo may now be seen in many parts of the world (having been introduced there recently), **its natural habitat is South and South-east Asia.** On the Indian subcontinent, it was depicted in the Harappan art of the 3[rd] millennium BC, while its skeletal remains have been found in the Neolithic levels at Mehrgarh, datable to the 6th-7th millennia BC

Siṁha (Lion, *Panthera leo*)

Regarded as the most dreaded animal, with a thunderous roar, the ***siṁha*** has been referred to in well over a dozen verses in the ***Ṛigveda,*** e.g. **1.64.8; 4.16.14, etc.** There is a reference even to its being caught in a trap **(*RV* 10.28.10). As of now, in the wild state the lion is met with in the Gir Forest of India and south of Sahara in Africa**

Hastin/Vāraṇa (Elephas maximus and Loxodonta africana)

Both the above-mentioned words, viz. ***Hastin*** and ***Varaṇa,*** occur in the ***Ṛigveda*** to denote the elephant. In order to indicate that in the contexts concerned it is the wild elephant that is meant, the word ***mṛiga*** was used in addition (***RV*** **1.64.7; 8.33.8).** Size-wise, the elephant is the biggest animal found on land. There are two sub-species: one, known as **Elephas maximus, inhabiting South and South-east Asia** and the other, called **Loxodonta africana, found in Africa.**

And now to the **birds.**

Chakravāka (Anas casarca)

In ***RV*** **2.39.3** the devotee prays to the two Aśvins to come to him like the pair of ***Chakravākas*** .These have all along been referred to in Indian literature as a symbol of great mutual love and fidelity. It seems to be a typical **Indian bird.**

Mayūra (Peafowl)

Both the ***Mayūra*** (the male, peacock) and ***Mayūrī*** (the female, peahen) have been referred to in the *Ṛigveda:* the former in ***RV*** **3.45.1 & 8.1.25** and the latter in ***RV*** **1.191.14.** There are two sub-species of this bird. One, known as ***Pavo cristatus,*** is met with in **India, Sri Lanka, Myanmar, Malaysia and Indonesia.** The other, called ***Afropavo congensis,*** inhabits the **Congo basin of Africa.**

The distribution-pattern of the Rigvedic flora and fauna, as discussed above, shows beyond any shadow of doubt that their *natural habitat is the tropical zone and not the cold one*. Indeed, there is no mention whatsoever of any typically cold-climate tree/plant or animal/bird in the *Ṛigveda. Nor is in any way even their memory reflected. Thus, both the positive and negative kinds of evidences show that the Ṛigvedic Aryans had nothing to do with a cold-climate zone.*

Indeed, as I have stated elsewhere (Lal 1997: 281-87), it was high time to re-think and give a ceremonial burial to the theory of 'Aryan Invasion of India'

[On the occasion of the Archaeological Conference

held under the auspices of the Asiatic Society at Mumbai on November 5-6, 2004, Professor B. B. Lal was expected to deliver a lecture on the above-noted subject. Unfortunately, owing to indifferent health he was held up in USA and could not attend the Conference. At our request, however, he has supplied us with this Note which, it is hoped, would interest the readers. It is based on, and contains excerpts from, his fully illustrated book on the same subject, expected to be out by January 2005. *Eds.*]

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Unearthing Harappan Settlement at Bhirrana (2003-04)

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Introduction

The village, Bhirrana (Lat. 29° 33′ N; Long. 75° 33′ E) is situated in the Fatehabad district of Haryana state. (Fig. 1). It lies at a distance of about 220 km to the northwest of New Delhi on the New Delhi-Fazilka National Highway and about 14 km northeast of its District Headquarter, Fatehabad The Harappan mound at Bhirrana is located in the northern outskirts of the village, overlooking the left bank of the now dried up river, Saraswati.

The mound measuring 150 m north-south and 190 m east-west, rises to a height of about 5.50 m from the surrounding area of flat alluvial sottar plain. The eastern part of the mound is relatively higher than the western part as the latter was flattened for agricultural purpose in the recent past. A trough-like feature in the south central part of the mound has a gradual slope towards the south. (Fig. 2) During the pre-independence period the site served the purpose of a graveyard, as a result, now, the excavated trenches are dotted with innumerable number of deep grave pits of oval and oblong shapes distorting and destroying the ancient structures.

Presently the site is under the protection of the Department of Archaeology and Museum, Government of Haryana. Under the Saraswati Heritage Project of the Archaeological Survey of India and under the direction of the first author, the excavation was undertaken from December 2003 to May 2004.

Objectives of Excavation

The objectives of the excavation were three fold:

1) Determining the regional identity of the Harappans in the Saraswati river valley;

2) Understanding the cultural sequence and chronology of the site; and

3) Settlement pattern of the Early Harappans in the Saraswati river valley.

Layout

The site was divided into horizontal grids having standardised zones of A, X, Y and Z, with each trench measuring 10 m x 10 m, laid out in the north-south and east-west axis. Sixty seven trenches (inclusive of partially and fully exposed) were excavated in the first season's

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work. The maximum habitational deposit at the site was 4.20 m and represents three Periods

Period I: Early Harappan
Period II: Transitional
Period III: Mature Harappan

Period-I

The information regarding the Early Harappans is inconclusive and sketchy due to shortage of operational area at lower levels as most of the exposed Mature Harappan structures overlie the Early Harappan deposit. The maximum cultural deposit of this period is about 1.70 to 1.80 m.

The earliest settlers at Bhirrana occupied the central and western sides of the mound. The structures encountered in this period are the subterranean dwelling pits cut into the natural soil. They are mostly circular in shape with occasional brick lining. The bricks used are of irregular shape and as such do not conform to the known ratio of the Early Harappan brick sizes. The inside walls of the pits were mud plastered. The average diameter of the pit was 2.30 m. No traces of post-holes have been found. This unique tradition of pit dwelling, especially in the Early Harappan context of Haryana region, was in practice as reported from period I at Mitathal, Dist. Hissar (Bhan 1975: p.12) and at Kunal, Dist. Fatehabad. (*IAR 1991-92* pp. 37-39).

The ceramic repertoire of Period I include all the six fabrics of pottery reported from Kalibangan. The prominent shapes are vase, dish, bowl, basin, and miniature pots. The motifs painted in black over red surface include horizontal bands, loop designs, horn with *pipal* leaf, unidentified leaves and fish scale design etc. The distinguishing ceramic of the period is the bichrome ware where the outlines of the motifs are painted in black and the space within is painted in evanescent white. The use of these two colours is a distinctive feature of the Early Harappans in the Saraswati Valley and beyond as far south-west as Sindh and the North West Frontier Province in Pakistan (Lal 2002: p.301). The prominent shapes in bichrome ware include small bowls, jars and vases with blunt carination at the waist and miniature pots. The design elements comprise of solid triangle, *pipal* leaf, four petalled rosette and sun motifs. A few potsherds bear simple graffiti, like slanting lines to ornate animals, like deer etc.

Though the use of copper was limited, it was not wanting as attested to by two small copper rods. The other notable antiquities include bangles of shell and terracotta with square or rectangular cross section: multi segmented terracotta bangles; beads of terracotta, shell, faience, agate, carnelian, and jasper; terracotta cakes; stone pounders, mullers and marbles and other miscellaneous objects.

Period-II

This period witnessed a phenomenal change in the settlement pattern. The entire site was occupied and the town appears to have been fortified which needs to be confirmed in the coming season's work. The people started living in overground rectangular houses built of mud bricks of pink and buff colour, of the size 30 x 20 x 10 cm, 33 x 22 x 11 cm mud 36 x 24 x 12 cm conforming to the ratio of 3:2:1. The structures are constructed in English Bond method. The floors of the houses were occasionally paved with mud bricks. The evidences show that people stuck to a definite planning and the structures were oriented to cardinal directions with provision of street or pathways. Besides a few rectangular mud brick platforms with circular fire pits and hearths were also exposed.

In addition to the shapes of earlier periods the pottery assemblage comprises of newly introduced shapes like dish-on-stand and button based goblets. The painted designs include those of geometric, floral and faunal motifs like simple bands, opposite triangles, *pipal* and palm leaf, butterfly and fish motifs.

The antiquities recorded from this period consist of a cache of 3461 beads (248 beads of lapis lazuli, 152 of carnelian, 370 of shell, 619 of faience, 3 of agate, 1 each of chalcedony and terracotta and 2067 of steatite) recovered from the surface. Besides, the other antiquities recovered from stratified deposits are as follows: copper objects, beads made of terracotta, shell and semi precious stones, like agate, carnelian, jasper, steatite and faience; bangles of faience and terracotta; stone querns and mullers; triangular, *idli* (round) and oval-shaped terracotta cakes-the latter two with finger impressions.

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Dispersal of Settlements in Haryana From Early Harappan to Late Harappan Periods

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Space has been of paramount importance for man since he shifted to sendentry life and establishes settlements for his living (James, PE 1960). In this process he has interacted with his environment in manifold ways and these interactions in turn, has given him an ability to select from the bounty of natural resources, resulting in his choice of suitable place for living considering a multitude of factors ranging from economic through socio-cultural to security from natural calamities. Thus, settlements in any period is not by-chance, but according to certain physio-socio-cultural requirements of the society.

Bylund (1960) conducted a study on settlement dispersal in inner North Sweden and derived a hypothetical model of development of settlements (Fig.1). He came to three conclusions :

1. The attraction exerted by an area on presumptive settlers is inversely proportional to distance from a road;

2. Area close to a church or market place exerts a high attraction;

3. New land is colonized from parent settlement.

But Ollson (1968) found that the study of Bylund was not objective and hence "Trend Analysis" was made by him on the basis of maps of different time periods. Birch (1967) used quadrant method for the purpose. A number of methods may be used varying from nearest "neighbour analysis" to "entropy model".

Objectives

The present study attempts to derive some generalizations from the dispersal of settlements in Early Harappan, Harappan and Late Harappan periods. This will lead to conclusions as to the human preferences of the times for living besides delineating the manifold facets of man-land interactions. Through this analysis one can derive significant formulations regarding sequent occupancy of space and man's role in development of landscape.

Method of Analysis and Database

The present study is based upon spatio-temporal analysis of settlements. The underlying assumption is that settlements grow in response to favourable area and the vicinity of larger and significant settlements provides good areas for settlement and growth. Hence, clustering of settlements may occur along central, radial or linear

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resources depending upon the localization of resources (Hodder and Orton, 1976)

The linkage among settlement may be studied by analyzing the distributional pattern of archeological sites with the help of maps of different periods. In the present study data of sites is based on earlier studies (Silak Ram, 1972, Punia D.P.S., 1976, Manmohan Kumar, 1978, Amar Singh, 1981, Suraj Bhan, 1976).

The Method of analysis adopted in the present study is based upon the axiom of "distance-decay effect". For this purpose concentric circles have been drawn on the basis of various uniform distances in multiples of 10 km (Fig.2 & Fig.3). The centre for these concentric circles has been taken from prominent and principal sites of that period e g. Rakhigarhi (R), Banawali (BW), Mitathal (M) and Balu (BL) in Fig.2 and in Fig.3, Bhagwanpura (B) has also been taken for this purpose.

Analysis

An overview of Figure 2 suggests a great concentration of settlements between rings of 10 km and 20 km around Rakhigarhi (R), Balu (BL) and Mitathal (M). This suggests that 10 to 20 km were convenient distances in those times and beyond this distance the number of settlements is comparatively smaller. On the other hand the number of settlements around Banawali (BW) is comparatively low suggesting relatively lower significance of this settlement as compared to Rakhigarhi and Balu. Most of the settlements of Early Harappen period are concentrated in zones of influence of Rakhigarhi, however, a significant number of settlements is prevalent in zone of 20 km. to 30 km. and even in 30 km to 40 km.

Early Harappan Period

During Early Harappan period, Rakhigarhi seems to be the most important site having larger zone of influence, however, Mitathal and Balu also seem to have attained some significance at this time. Moreover, pattern of settlement dispersal is not altogether concentric rather it has probably been distorted by the river systems of the Saraswati and the Drishadwati Linear patterns of settlement dispersal are imminent along the courses of the Saraswati, Drishadwati and Yamuna River. Zone around Banawali has comparatively smaller of settlements owing mainly to climatic constraints i.e. increasing aridity in western Haryana. Agriculture being the mainstay of people during those times, settlement pattern reveals a tendency towards self-dependent entities as well. However, central place services also played a significant role as suggested by site-clustering around Rakhigarhi, Balu and Mitathal. Some isolated clusters of settlements are also visible in souh-eastern Haryana.

Harappan Period

During the Mature Harappan period settlements dispersed outside the influence zones of Rakhigarhi, Balu and Mitathal (Fig.2). But settlements flourished along the Yamuna basin and if we extend concentric circles from 30 km and 40 km radius taking Balu as the centre then we find more settlements in the zone of influence of Balu. In other words Balu, comparatively a small site, or some other site nearby probably gained more significance as compared to Rakhigarhi and Mitathal. In mature period the frequency of sites increases (Fig.2). This suggests an eastward dispersal of settlements, probably owing to increased pressure of population on older settlements and search for new arable lands. More fertile lands in eastern sector attracted more settlements as compared to western part.

Besides, central places always provide services to their surrounding territories and emergence of function in central places is always controlled by the nature of its surrounding territory. Even today urban centres grow in response to needs generated by surrounding rural territories. In Early Harappan and Harappan stages larger settlements might have worked as central places, however, these larger settlement, cannot be called urban, as nature of functions was mainly "primary" type. But Rakhigarhi seems still important for the growth of settlements as number of sites significantly decreases after the 40 km circle, while between 20 km to 40 km circle a large number of settlements persist. Similarly, Balu and Mitathal have a good concentration of settlement as number of sites significantly decreases after 40 km circle, while between 20 km to 40 km circle a large number of settlements persist

Late Harappan Period

During the Late Harappan period the trend of eastward expansion continued (Fig.3). In the Late-Harappan stage many new sites emerged mainly in north-eastern part of Haryana. However, influence of Rakhigarhi is yet prominent, but Bhagwanpura (B) seems to have attained larger significance in this stage. The concentration of settlements in the periphery of Rakhigarhi and Balu has increased while Bhagwanpura is emerging as a new centre for attracting settlements eastwards. In this phase the whole settlement system has transformed from arid western side to humid and fertile eastern zone. Moreover, emergence of secondary and tertiary economic sectors in Late-Harappan phase might have led to proliferation of new service centres and consequent growth of new settlements. It is interesting to note that while settlements shifted from western to eastern part yet emergence of few new settlements in 30 km to 40 km zone of influence of Rakhigarhi in western side shows the need of new service centres.

Subsequent works have shown new sites which are still unexplored in areas of Bhiwani and Rohtak. Moreover exploration of new sites in Sonepat, Gohanna and Rohtak region may attest to this growth pattern.

Limitations

The present study has some limitations also. Firstly, we have limited our study to Haryana only though adjacent regions of Punjab, Rajasthan and western Uttar Pradesh also have quite a large number of sites. If this study is extended to those regions also, it may lead to some useful derivations regarding spatial dispersal phenomena. But this requires a lot of field-work and finances to undertake an in- depth study. Secondly, this study has been limited to simple cartographic techniques. A more elaborate cartographic-statistical analysis can be made to find out level of clustering and levels of dispersal which may prove to be of paramount significance for a detailed analysis of settlement pattern. If an elaborate project is taken up on these lines it may unfold the rich cultural heritage and the spatial distribution of Early Harappan through Mature Harappan to Late Harappan periods.

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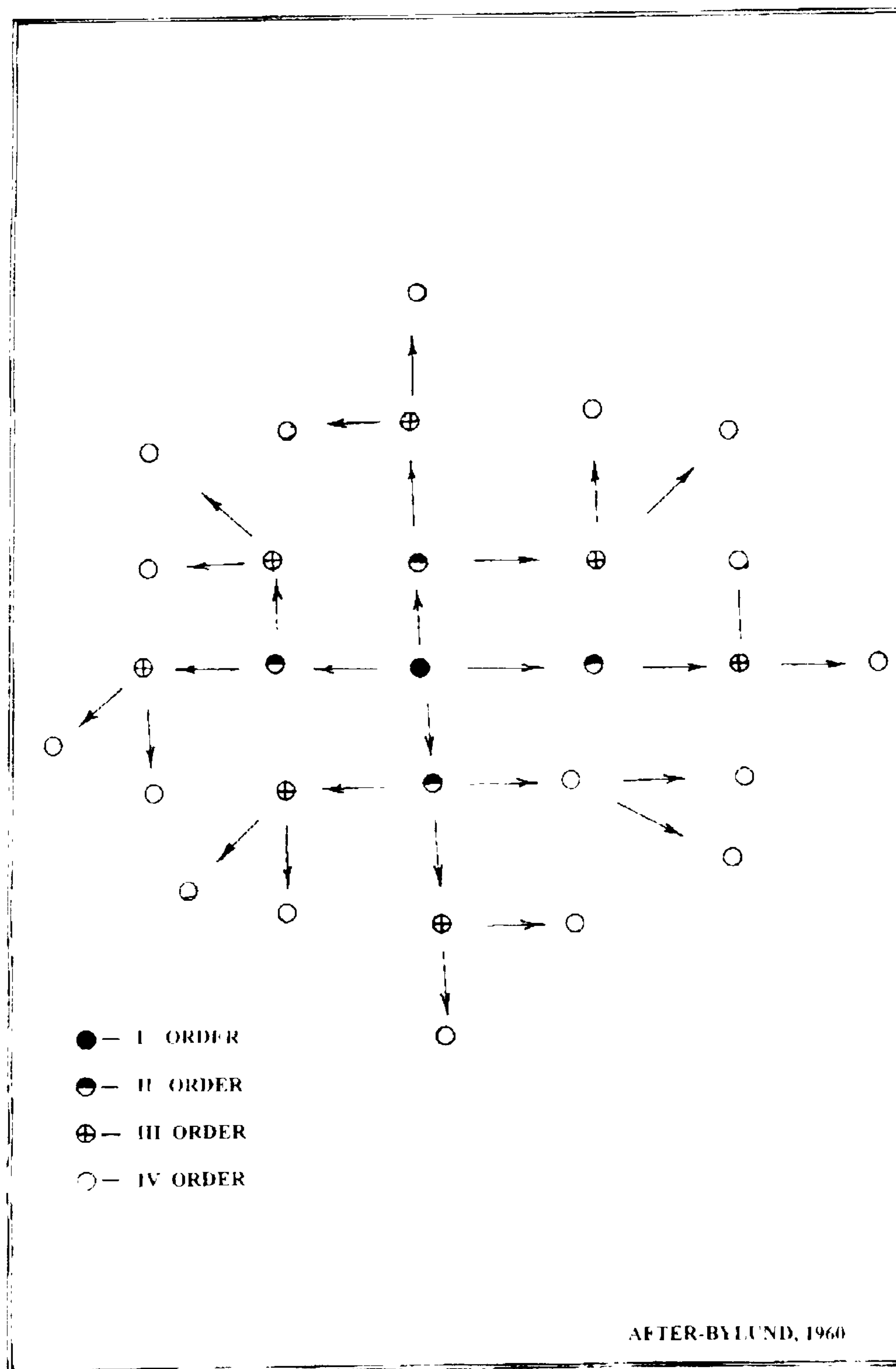


Fig. 1. A Model of Settlement Growth

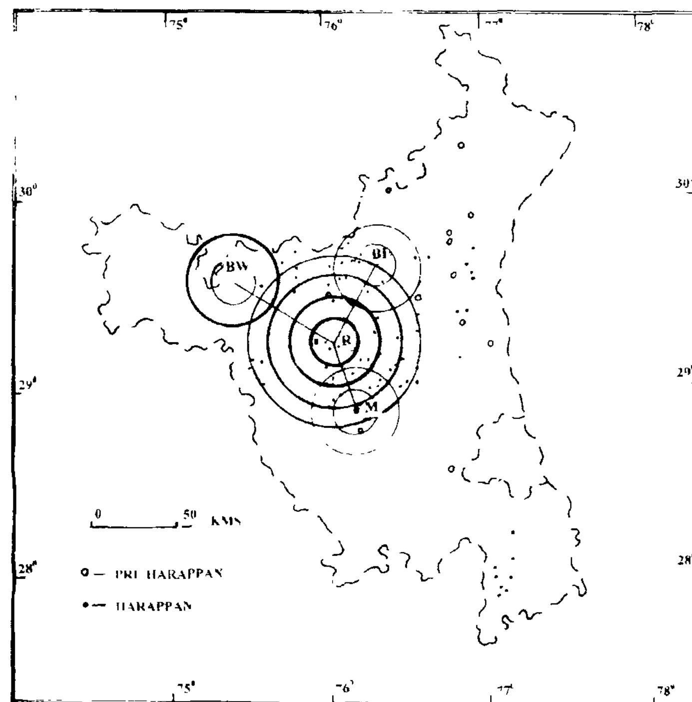


Fig. 2. Pre-Harappan and Harappan Sites

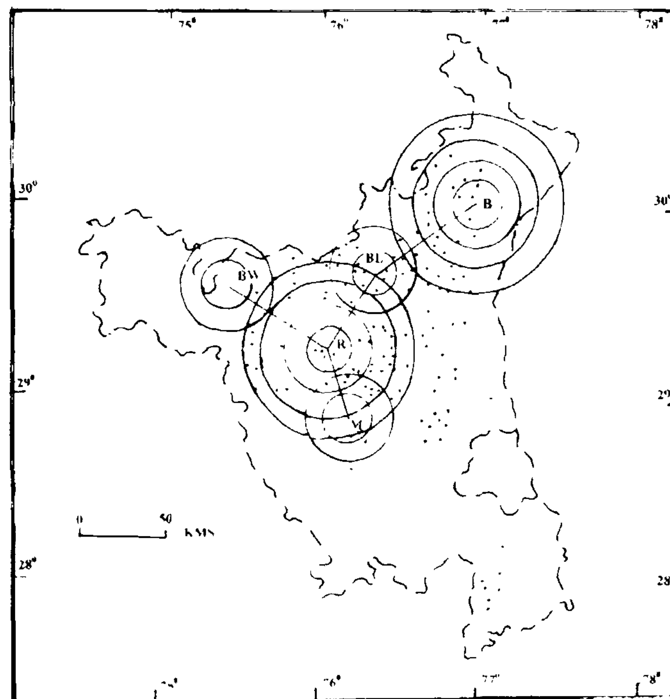


Fig. 3. Late Harappan Sites

Tarkhanewala Dera and Chak 86 (2003-2004)

P.K. TRIVEDI AND J.K. PATNAIK*

1. Site and Environment - Tarkhanewala Dera and Chak 86 (Lat. 29°15' N; Long. 73°14' E) are individual ancient mounds located in the dried up bed of river Sarasvati in Anupgarh tehsil, District Sri Ganganagar of Bikaner division of Rajasthan. Both these centrally protected site are situated at a distance of about 6 km north of Anupgarh on the State Highway No.3 leading to Ganganagar. Both these settlements are sited at a distance of 250 m in the same locality. The marginal ridges of accumulated sand seem to represent ancient river-banks as indicated by the occurrence on them of freshwater shells which got deposited on the banks of the river when it was alive. The area is ill-watered and sandy but becomes a vast green pasture land covered with rich succulent grasses during the rains. Due to limited irrigation facilities different crops are also cultivated now viz. Bajra (Balrush Millet *-Pennisetum - typhoideum pers.*), Jowar or Sorghum (*Sorghum Vulgare Pers.*), Maize (*Zea Maya L.*), Rice (*Oryza Sativa*), Wheat (*Triticum Spp*) Barley (*Hordeum Vulgare*), Gram (*Cicer arietinum*), Arhar (*Cajanus Indicus*), Cotton (*Gossypium Sp*), Sanhemp (*Crotalaria Juncea*), Sugarcane (*Sacharun Officinarum L.*), oilseeds etc. The main fruits grown are maltas, mossambies, mangoes, lemons, guava and grapes.

2. Previous work - A part of the Sarasvati valley in Bikaner Division as well as Bahawalpur area (Pakistan) had already been surveyed by Sir Marc Aurel Stein in 1940-41 (Stein 1942:174-82; 1989:1-97). But because of his inference "that there are no prehistoric" mounds east of Fort Abbas in Bahawalpur state with pottery of chalcolithic period by which he no doubted meant the period represented at Harappa and Mohenjo-daro. A. Ghosh of the Archaeological Survey of India took up further explorations in this area in 1951-51. As a result in addition several protohistoric and early historic sites, Ghosh also located two sites under reference, situated close to each other. He took up a few small exploratory trenches to ascertain the nature of their deposits. Tarkhanewala-Dera yielded remains of mature Harappan settlement and Chak-86 brought to light relics of the PGW using people. In this particular area, both the cultures never came in contact with each other; nay each settlement originated and died out in its own time, entirely independent of each other (Ghosh 1951:104-105).

Because of a large brick kiln, sandy deposit, State Highway No. 3 and cultivation of crops the dimension of the ancient settlement of Tarkhanewala Dera could not be ascertained. The old people of the neighbourhood, however, informed that local farmers have reduced it from 2.0 m to the present level for cultivation purpose.

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3. Present field work

(A) Tarkhanewala Dera

For unveiling the cultural matrix of this mature Harappan settlement already identified (Ghosh 1962:3), as many as ten trenches viz. A1,B1,C1, XA1, XB1, XC1, YA1, YB1, YC1 were taken up for excavation. During earlier excavation a made-up platform, on which stood up a modest Harappan settlement, was noticed, by excavation, an oblong standing cremation-ground marked off by flatly laid mud bricks, in which there had been at least five cremations (Pl. 1). After each cremation, marked by ashes and bits of charred bone (sometimes collected in pots), the ground within the enclosure was leveled by a coating of clay or mud-bricks for the next cremation to take place. That the Harappans cremated at least five of their dead at this place seems established; but the conclusion that extended inhumation was the normal practice of the Harappans need not be prejudiced by this single isolated instance (Ghosh 1962).

Some residential structures made of sun-dried bricks (7 x 14 x 28 cm, 8 x 16 32 cm) following the Harappan specification (1:2:4) were noticed. The mud mortar used contains chass, ash and husk as ingredients. To the east of the mud platform was found a rectangular hall, rooms of other edifices being square or rectangular on plan. One room identified as kitchen was filled with a variety of pottery and also provided with a soak-pit made through a large vase by cutting the bottom of the pot. Two such examples have been found. This tradition is still seen in the locality.

2. A square fire-altar lined with mud bricks found filled with charcoal, ash, terracotta cakes and potsherds similar to Kalibangan was noticed in the residential area immediately below the surface.

3. When the houses had almost fallen in disuse, the area appears to have been manufacturing the pots. Two pyriform potter's kilns lined with a single course of sun-dried bricks were recorded (Kenoyer 1998:151). One has retained a square (36 x 36 cm) terracotta stele (55 cm high) plastered with clay, in the centre to maintain uniformity of temperature. Both the kilns contain pottery, cakes, morsels, ash etc. two broken vases retaining their lower parts for keeping water for the use of kiln were also found nearby.

Antiquities

(a) Terracotta

(i) Seal and sealings : An impression of a seal on terracotta lump exhibiting a figure of a unicorn and letters in typical Harappan characters (Pl. 2) and a rectangular seal with boss deserve to be pointed out (Pl. 3).

(ii) Beads : A large number of terracotta beads include circular, oval, cylindrical, elongated, disc, ovaloid, truncated biconical, heart shaped, plano-convex, spherical, etc. with axial perforations or pinholes at both ends.

(iii) Spools and spindle whorls : About two dozen spools with two prominent bulging hubs (drum like) at either end meant for rolling thread/fibre. A majority of them is not well fired. Ten spindle whorls (spinning tops) with elongated circular knob at the centre and wide flange at the base were found. Alike spools they are also grey in colour.

(iv) Toy-cart frame : Six rectangular cart frames were found. These well-fired solid chassis, either concave or flat bear perforation for wooden posts.

(v) Baby feeder: A piece representing flat based spouted baby feeder shows a wide opening for pouring milk, water, etc. This variety is also reported from Kalibagan.

(vi) Spout : A well fired truncated spout bearing three perforations is in badly damaged condition.

(vii) Animal figurines : About half a dozen stylized and realistic animal figurines in damaged state have been recorded. They include humped bull, elephant, squired head (?) etc. These are handmade, notched or decorated with applique designs.

(viii) Human figurine : A seated human figurine with a notched head bearing three perforations indicated eyes and mouth; the broken hands and feet are modelled in rudimentary fashion (Pl. 4).

(ix) Sling balls : About dozen well fired sling balls used

for catapult were recorded. They are of varying dimension and in different state of preservation.

(x) Wheels : A dozen solid wheels of toycart were found. They are well fired and deviced with projected double hubs and perforations.

(xi) Bangles : A plenty of bangles were found scattered over the site as well as in the stratified context. They vary in dimension and display circular, oval, square, rectangular or lenticular section. Usually they are plain and occasionally exhibit the trances of slip.

(xii) Cakes : They are made from a mixture of husk, grit and finely levigated clay. The size vary from 4 to 9 cm and display triangular, oval or round shapes. A few examples of (musthtikas) were also recorded.

(xiii) Gamesman : Three solid gamesman with flat base, tapering cylindrical or conical profile were found.

(xiv) Pyramidal weight: Four well baked pyramidal objects were perhaps used as weight.

(xv) Circular tablets : More than half a dozen circular objects bearing a concavity on either side made by finger tips were found. One of them is decorated with incised floral petal motif. Perhaps they were used as weights.

(xvi) Crucibles : Three crucibles of different dimensions were found. In one crucible, which rests on a low foot, was found the traces of carbon soot.

(b) Stone objects

(i) Cube : A broken cube made of yellowish chert was used as a unit of weight.

(ii) Drill-bits : Three specimens made of arnestite and phtanite stone were used for drilling the beads.

(iii) Blades : More than two dozen parallel-sided blades, some retaining the sheen and a few retouched ones were found. While a majority of them is made on chert, some fragmentary pieces are worked on chalcedony (Pl. 5).

(iv) Sling balls : About half a dozen sling balls made of quartzite were found.

(v) Bangles : Bangles are made of faience and or either plain or decorated with parallel grooves, oblique lines, mid ridges, denticulate borders, etc. They are oval or triangular in section.

(vi) About a dozen amulets of serpentine were found. These are very small, given a fine smoothened finish and truncated cylindrical in profile with an incised line near the head for holding a cord or wire. (Pl. 6).

(vii) A number of cylindrical, circular, biconical, barrel, elongated, spherical steatite beads were found, besides some disc and spherical shaped microbeads (Pl. 7)

(viii) The shapes of faience beads comprise short cylindrical, circular spherical, barrel and truncated biconical, but the majority is represented by circular and spherical types.

(ix) Purplish red carnelian beads includes elongated cylindrical, truncated cylindrical, barrel, spherical, disk, truncated spherical etc.

(x) A few beads made of banded agate comprise the types viz., elongated cylindrical, barrel, lenticular, truncated cylindrical, etc. (Pl. 8).

(c) Copper objects

The copper finds include a tanged spearhead made of thin sheet, shaped like an elongated leaf sharpened at both the edges (Pl. 9), besides copper rods, chisel, needle, fish hooks, drill bits etc., used for different purposes. The ornaments comprise of earstud, bangle, rings and one tablet (Pl. 10).

(d) Bone objects

The bone implements are broken at the distal ends but show traces of polish. The types include points (circular in section), styli and a finely pointed awl.

(e) Pottery

The ceramic assemblage comprises red, dull red, grey and few shreds of black on red ware. The painting are executed in black, chocolate, purple, black and rarely white or creamy colour. The designs comprise of tree,

peepal leaf, deer, peacock, etc. While geometrical motifs include horizontal bands, dots, loops, chain, linear pattern, etc. Some heavy and sturdy storage jars were decorated with cord impression. In some cases interior was found bearing deeply incised parallel lines, concentric circles and scales. The fragments of perforated jars, bowls, goblets, beakers, dish-on-stand, vases, knobbed lid, basins, miniature pots, pedestalled bases etc., commonly met in the Harappan sites were also collected but unfortunately none was found in intact state.

B. Chak 86

The ancient mound is situated close to the modern village G.B. 87 and falls within the revenue limits of the same. About four year ago the mound was occupied by a hamlet, now shifted elsewhere. The mound is spread in an area of 5.5 hectares. With a view to recheck the results of previous excavation three trenches, viz. A1, A2 and A3 were sunk on the top of the mound (250 x 250 m) which is 3.5 m high from the surrounding plains. The excavation unveiled six circular plans representing the huts of which only two could be completely identified. Their diameter varies from 1.80 to 2.20 m while the thickness of the perimeter ranges 15-25 cm. The perimeter also indicated the traces of postholes and a few burnt potsherds. As compared with compact natural soil, this ashy deposit is quite loose in texture. Presumably these huts were meant for food/herd stock as well as residential purpose. An oval shaped heart was also partially exposed. Below the circular huts were recorded four to five mud bricks placed horizontally in an alignment. The stratigraphy reveals that over the compact natural earth was deposited a slightly loose and sandy accumulation which was utilized by the folk to construct mud brick structures and wattle and daub hutments.

Antiquities

(a) Terracotta Objects - The finds comprise of animal figurines, sling balls, wheels, discs and beads and one hopscotch. The handmade objects made of fine levigated clay are well-baked, provided with thin slip and vary from deep red to blackish grey in colour.

(i) Animal figurines : Of the three fragment pieces, one appears to be that of a humped bull, while two others could not be identified (Pl. 11).

(ii) Toycart frames : Two examples of broken toy-cart frame provided with perforations were recorded.

(iii) Sling balls : Twelve balls of different sizes were found, which might have been used for shooting the prey or children's game.

(iv) Beads : They are twenty-nine in number and comprise of twelve circular, two *ghat* shaped, two biconical, ten truncated biconical, two barrel shaped, and one arecanut shaped variety (Pl. 12).

(b) Stone objects - Fragment of a chert blade appears to have been travelled from the nearby Harappan settlement; one ball and a spheroid respectively made of quartzite and light greenish faience were found. Some fragments of faience bangles bearing incised parallel and oblique designs were also picked up, besides fragments of a glass ? bangle (Pl. 13). A part from this eighteen beads are made of semi-precious stones, viz. carnelian, lapislazuli, quartz and black stone. The types comprise short and long truncated barrel, cylindrical, etched triangular circular, standard spacer, discoids, etc. (Pl. 14).

(c) Shell and Bone objects - Two microbeads, fragment of a bangle in shell, one cowrie shell were also documented. The six polished bone objects include two styli, one awl, one point and two arrowheads (Pl. 15).

(d) Pottery - The ceramics are represented by typical Painted Grey Ware, plain black ware, red ware and grey ware. The PGW is fine in texture and comprise bowls with straightsided rims, cups and dishes with convex base. The black paintings executed on exterior and interior include different designs viz., linear, dotted patterns, horizontal bands, group of vertical or oblique strokes, intersecting lines, row of dots, dots, dashes, sigmas etc. Sometimes the pots were found without painting.

The black polished ware varies from fine to medium fabric and comprises types akin to the PGW. The red ware constitutes yet another variety. It includes miniature pots, bowls, spouted vessel, carinated pots, knobbed lids, vases, etc. Whereas the fabric ranges from medium to coarse, the exterior and interior are decorated with incised designs viz., circles, concentric circular, chequered pattern, loops, oblique and horizontal lines. The

associated plain greyware is represented by miniature pots, bowls, handis, vases, jars, etc. Some of the impressed potsherds are bedecked with horizontal lines, concentric circles with radiating lines, oblique notches, geometric pattern, plants, intersecting squares, concentric triangles, lozenges etc.

4. Observations

A perusal of the data revealed through above field work confirms that :

(1) Tarkhanewala Dera was inhabited only during Mature Harappan period. The cremation practice, as recorded previously by A. Ghosh could not be confirmed, obviously because the upper deposit of the settlement has been razed to the present ground level during the last decades.

(2) Chak 86 was again confirmed to be a single culture PGW site. Here no iron object was found.

(3) Though both the settlements are situated close by, their cultural matrices do not betray any relationship i.e. even after the desertion of the Tarkhanewala Dera, the Harappan folk never occupied the Chak 86.

Acknowledgement

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Sanauli: A Late Harappan Burial Site in the Yamuna-Hindon Doab

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Archaeological investigations on the Harappan civilization are now going on for nearly nine decades (Marshall 1931, Mackay 1948, Mughal 1972, 1982, Joshi 1978, 1984, Dikshit 1979, 1982, Joshi *et al* 1984, Bhan 1989, Besenval 1992, Bisht 1991, IAR), yet the interest in the subject is on the rise. The ongoing investigations, both in the field and the laboratory, have continuously been revealing many hitherto unknown facets of this civilization which are encouraging, and have potential, to discover more. It should not surprise scholars engaged in the Harappan studies if the present century stands witness to rigorous integration of database on the Harappan civilization on more holistic and scientific lines than what is realized up till now, particularly in the century that has gone by.

As interplay of several factors is believed to be responsible for the origins of the Harappa culture, so may be said for its demise as well. In other words, not a single factor alone can be held responsible for origins or decay of this civilization. For decay, the crumbling of the Harappan civilization under its own weight (Bisht 1984) seems to be more tenable. Among the reasons to have caused this, one of the major factors spelt out is drying up of the River Sarasvati (Mishra 1984) which served as life-line to the land and people of this civilization in its expansion to the east. Some scholars find the situation has parallels in ancient Indian literature, particularly in the Rig Veda and the Brahmanical literature which refer to drying up of the once mighty River Sarasvati, and a shift in the settlements towards the east (Fig. 1 & 2).

As referred to above, one of the major attraction areas for late Harappan settlements has been the western parts of modern Uttar Pradesh, watered by the Yamuna river system, mainly comprising the region circumscribed by Hindon, Kali Nadi and many other smaller tributaries of the system. Sites like Hulas, Alamgirpur, Mandoli, Bhorgarh, etc., which have been excavated in the past, have shown affinity with the Harappa civilization, and revealed late Harappan forms. In addition to the late Harappan sites, this region also hosts a large number of sites where the Ochre Coloured Pottery (OCP) is also found. It is in this regional setting that the site of Sanauli is situated.

The village of Sanauli (29°8′28″ N, 77°13′01″ E) is located on the Barot-Chhaprauli road, in tehsil Barot, District Baghpat of Uttar Pradesh, in the upper doab of Yamuna-Hindon rivers (Fig. 3). Presently, River Yamuna flows approximately at a distance of 8 km to the west of the village. The late Harappan habitation at the site, as revealed by the pottery assemblages and associated skeletons were found in the agricultural fields while the leveling operation was attempted by a villager, Yogeshwar Dutt Sharma. This agricultural field is located

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at a distance of approximately 500 m northeast of the modern village, amid the agricultural fields. The total extent of the burial site could not, in fact, be measured because of the standing crops. Associated with the burial site, there must have been at least a small-sized settlement lsite which also could not be located for the same reason. All these problems, along with the others, are required to be tackled whenever in future the work is taken up here.

An area of about 35 m (north-south) X 20 m (east-west), about 219 m above MSL, was subject to unplanned digging by the villager as stated above. The digging in the area was, however, deepened up to a depth of nearly 1.5 m. for taking out the alluvial earth. This has extensively damaged the human remains and only fragmentary bones could be collected.

The late Harappan pot-sherds and the skeletal remains are visible, though sparsely, on plan and sections of the exposed area. In one case, a skull was observed laid on the north, and the rest of the body, towards south. If this is any indication, it is quite likely that the extended burial with body laid at rest broadly in north-south orientation was one of the modes for disposing the dead.

A skull portion was informed to have been removed by the villagers from the site, which, as it was intimated, got completely damaged later when the villagers innocently tried to clean the skull with plain water. The pottery vessels & vases, dishes-on-stand, bowls, and so on were also removed by the villagers from the site, some almost intact All these pottery specimens were later collected by the authors from the villagers and documented On further exploration of the site by the authors, several fragmentary pot-sherds, and complete examples, confirming the late Harappan pottery traditions of the region, were collected / recovered. One complete example of a vase was also recovered from the office of DC, where the villagers had kept out of curiosity and for publicity

The main finds from the site of Sanauli are pottery assemblages, which, on stylistic grounds, may be datable to the late Harappan times. Saving for one example, the whole pottery assemblage so far brought to notice is red ware. The principal shapes observed include (i) dish-on-stand, (ii) elliptical vases with or without footed base, (iii) pot-stand, (iv) jars, (v) small vases commonly called lota vases, (vi) deep and shallow bowls, (vii) bowl-cum-lid, (viii) miniature vessels, besides others. In the present collection is a decorative grey dish-on-stand par excellence.

(i) Dish-on-stand: Dish-on-stand in the present collection is represented both by red and grey ware. The dish-on-stand of the late Harappan tradition is characterized by the drooping rim, and examples from Sanauli in this regard are no exception. As stated above, a most tastefully decorated example of grey ware dish-on-stand is available in five pieces (fragments), which form part of one and same specimen. Out of five, four fragments could be joined together to represent the dish portion. The dish can be seen as having a drooping rim, typical of the late Harappan pottery. The reconstruction indicated that it was a shallow dish with a squat and hollow pedestal (Fig.4).

The distinct and interesting feature of this specimen is its decorative surface which was achieved by executing geometrical decorations in a variety of patterns. The decorations do not appear to follow a standard pattern, but the motifs appear repetitive Largely, they form (i) a group of concentric circles of notches enclosing a circlet, (ii) triple row of notches, (iii) row of notches along the edges of rim, (iv) pattern of circlets in clusters and in form of '+', in one instance confined within a lozenge formed by double lines of dots, and so on. The whole of dish area is filled with combination of dots, notches, and circlets arranged in concentric circles, rows or even at random at times. The stem of the dish-on-stand is also decorated with more or less similar patterns but less dense in execution (Fig. 5).

The decorative motifs were executed by creating shallow geometrically designed incisions, a pattern of concentric dots or grooves, by a sharp tool, probably made of metal, which were executed when the pottery was leather hard. These shallow grooves were later filled with white paste of chalky material (steatite powder?) forming an ornamental design against grey background, and fired. Firing enabled fusion of white paste with the body of pot with the result the former getting well stuck in place. The white paste has, however, now fallen down from certain places where the dish-on-stand has received fractures along the line of breakage.

The other fragments of red ware dish-on-stand are of usual description, and are commonly reported from many sites of comparable period (Fig. 6: 2 & 3; Fig. 5: 4 & 5).

The comparable shapes of dishes-on-stand from other late Harappan sites lile Bhagwanpura, Hulas, Mitathal, Mandi are shown in Figs. 7 & 10.

(ii) Elliptical vases: A major portion of the pottery repertoire in the present collection consists of ten elongated elliptical vases of red ware, of which two specimens were found intact. The remainders, which had the broken rims, were actually recovered from the collection of the villagers who had sliced away their rim portions and had been using them as drinking vessels as pottery tumblers. The artificially sliced rims of vases facilitated villagers to use them as drinking vessels as the information stand provided by the villagers.

Broadly, these elliptical vases can be classified into three categories: (a) tall, elongated and slandered (Fig. 8: 6-6A), (b) small and elongated (Fig. 8: 7), and (c) elongated and constricted base (Fig. 8: 8). All these examples could be with or without disc base; in all cases, however, the base is flat in order to allow the vessel to stand on its own.

The overall shape of these thin-sectioned vases is elliptical with an elongated 'S' shaped profile, further characterized by having a horizontally flaring out rim, concave neck and with or without footed base. In some cases, the interior surface of the vases was observed corrugated, which clearly indicate that these were made with the coil technique, but finished on wheel. Without rims, the height of these vases varies from 18 cm to 28 cm. The clay used in their manufacture was well levigated, in some cases mixed with sand and mica dust. The core, which was well oxidized, indicated that all the vases were well-fired with adequate supply of oxygen/air. As noted above, the section of these vases was very thin which was obtained with a purpose to render the pots look special and aesthetically pleasant. Most of these vases were treated with a plum-red slip, which originally might have been bright enough, but which now stands removed by the villagers by way of rubbing and hard-washing. At present, only two or three specimens could be seen retaining traces of the original slip. No painting or any other decorative motif of whatsoever description was observed on these vessel forms. Stylistically, the shapes are comparable with those found from the late Harappan sites of Hulas and Alamgirpur, etc., and OCP sites like Ambkheri and others.

(iii) Pot-stand: One complete specimen of a pot-stand (a dish-on-stand (?) with drooping rim) of pottery is yet one more interesting type of late Harappan ceramic tradition. It is broken in the middle and came out in three pieces. This pot-stand is thick-sectioned, having a thick-set hollow stem (Fig. 5: 9). With 14.5 cm as its height, its base is almost a mirror image of rim of the dish.

(iv) Jars: Fragments of jars available in the present representative collection belong to the types of wide-mouthed jars, jars having flaring out mouth, and normally wide mouth (Fig. 8: 10-12).

(v) Lota-shaped vessels: Lota-shaped vessels are common in the late Harappan context in this region, and in the present lot, there are two examples. The main difference between the two is in having the bulbous profile. Of red ware, both are of medium fabric, devoid of any slip and well fired (Fig. 8: 13-14).

(vi) Bowls: Four complete bowls of varying dimensions, besides fragments of other were noted. All the bowls belong to red ware, of medium fabric, and are well fired, and devoid of any slip. Among complete examples, one has incurved rim with tapering sides (Fig. 8: 15) while the other specimens have out-turned rims, convex profiles with varying depth and flat bases (Fig. 8: 16-19). Some of the shapes could be comparable with the specimen from other late Harappan sites like Hulas, Alamgirpur and Mitathal.

(vii) Bowl-cum-lid: Bowl-cum-lid is another common pottery type which is met with the pottery assemblages of this period. In the present examples, the type is simple, without any decoration (Fig. 8: 19). The other technical details with regard to their fabric and firing are the same as in case of bowls mentioned above.

(viii) Miniature pot: Miniature pots are common in most of the ceramic collections. These may represent children playthings as these are generally red ware and hand-made, and apparently deny their any other utilitarian use. Only one specimen of a miniature pot in the collection

was noticed (Fig. 8: 20).

The pottery styles and other cultural assemblages recovered from Sanauli have shown definitive affinity with the late Harappan sites in the region, on the one hand, and with the OCP sites on the other. A precise relationship between these cultures has still been eluding archaeologists, and awaiting final answer. What is actually required is to assume a full-scale excavation of a small settlement site of both late Harappan and OCP site and resolve the question once for all. So far, this approach in our field work to address this issue has been lacking.

If we look at the upper Ganga-Yamuna doab, the region today comprising western parts of modern Uttar Pradesh, it is, in colloquial terms, is called 'Harit Pradesh', meaning 'green land' It is so because the land offers bumper crops round the year since the soil is highly fertile. The land and its present environment must not have been appreciably different during the late Harappan times It may, therefore, be reasonable to presume that the late Harappans' interests in colonizing this region were chiefly agrarian. Corroboration to this assumption may be had from Hulas where subsistence pattern was possible to reconstruct on the basis of palaeobotanical remains gathered from the site in good measure. At Hulas, an adequately probed late Harappan site in the region, the evidence of varied food and a rich agricultural base is already established now. Interestingly, in addition to these, evidence of walnut (Juglans regia Linn) and almond (Preymus amygdalus Batsh) has come from Hulas, but which are not produced locally. It indicates that the items were imported into Hulas from distant regions. The reference is made here to emphasize the fact that the late Harappans were not necessarily all the time merely on the run in this region, but they also enjoyed trade and commercial activities, albeit subdued in nature and form if compared to those practiced by the mature Harappans.

In sum and substance, the total pottery assemblage so far recovered from Sanauli is that of the late Harappan style, showing complete absence of classical Harappan types. Devoid of paintings, the ceramics shapes as described above otherwise share striking correspondence with the Bara pottery types which are widely known and spread all over Punjab, parts of Haryana and the upper Ganga-Yamuna doab, as at Alamgirpur, Hulas Bhorgarh, and so on. At this stage there is no dating material in hand to estimate absolute date of the site. However, based on ceramic traditions, the site may be dated somewhere around the beginning of the second millennium B.C. The Archaeological Survey of India is due to start excavation at the site this summer, and it is hoped that some of the outstanding issues would find better answer.

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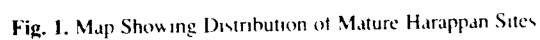


Fig. 1. Map Showing Distribution of Mature Harappan Sites

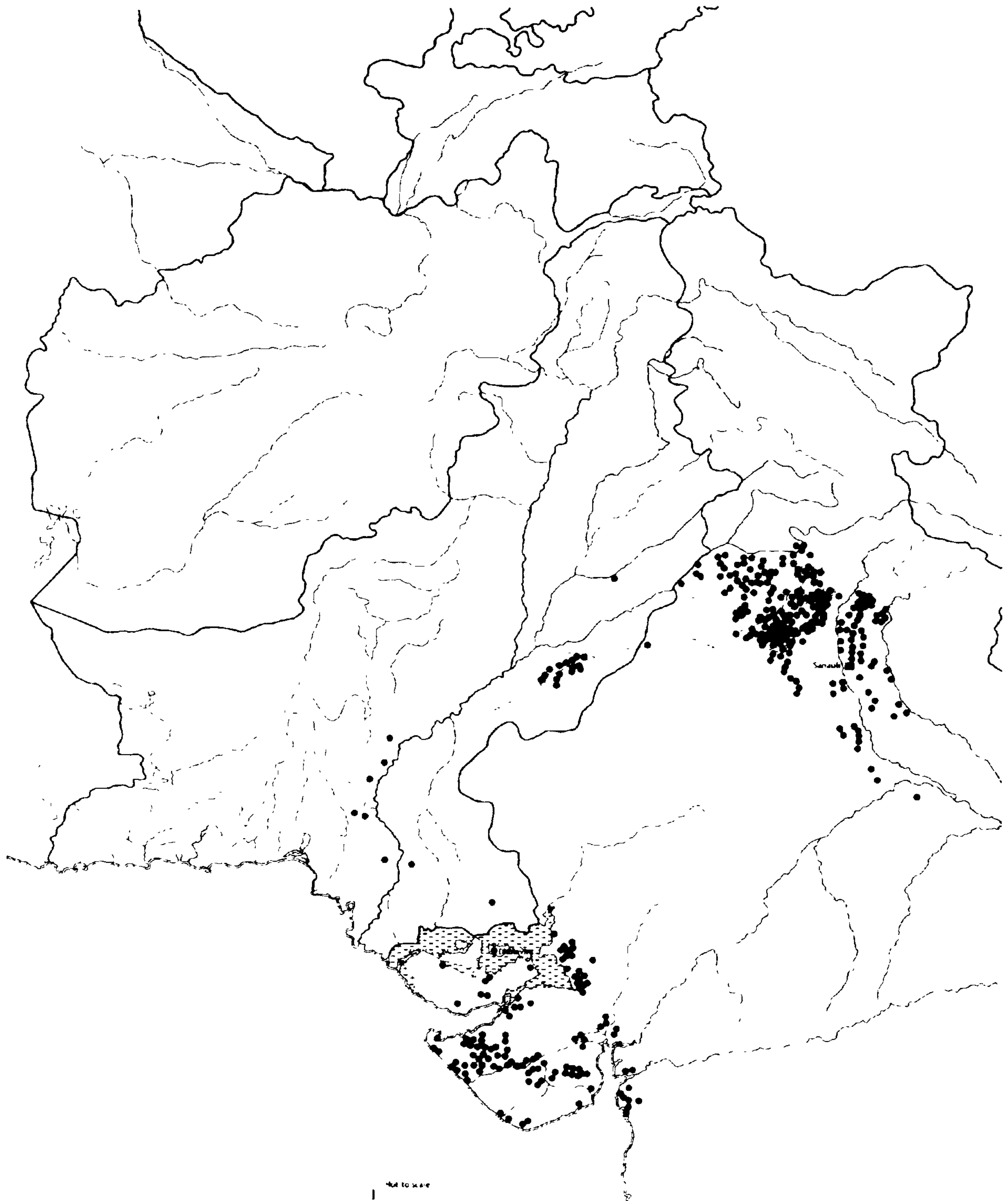


Fig. 2. Map Showing Distribution of Late / Post Harappan Sites

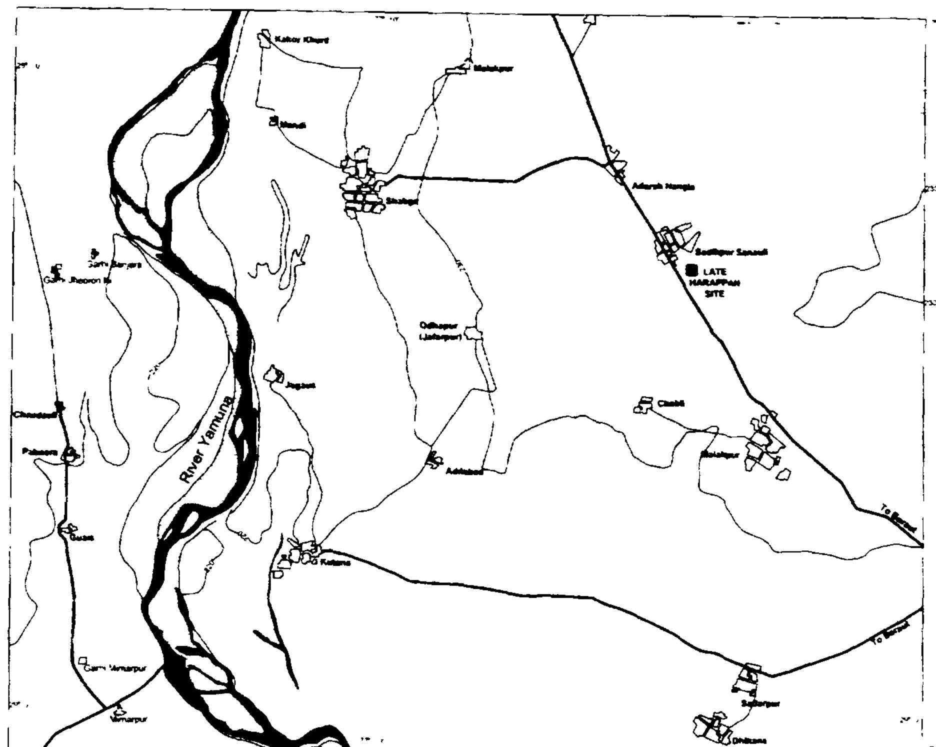


Fig. 3. Map Showing Find Spot of Late Harappan Burials, Sanauli, District Baghpat, U.P.

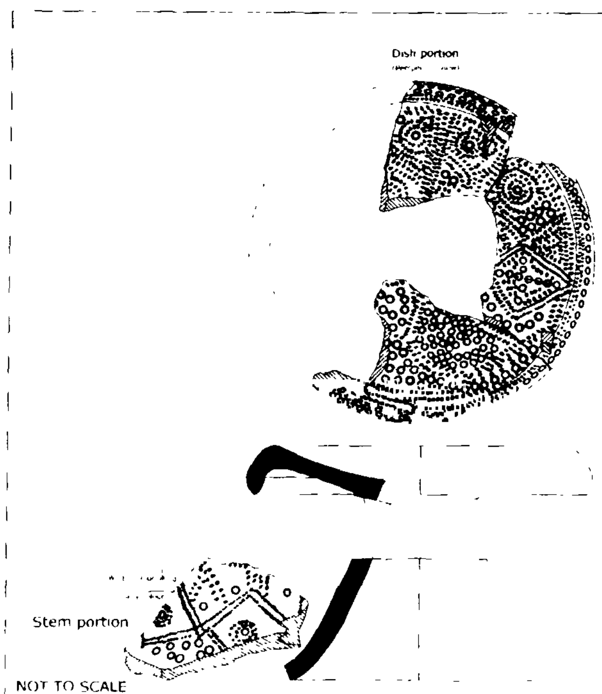


Fig. 4. Decorative Dish-on-Stand, Grey Ware, Sanauli, Dt Baghpat, U P.

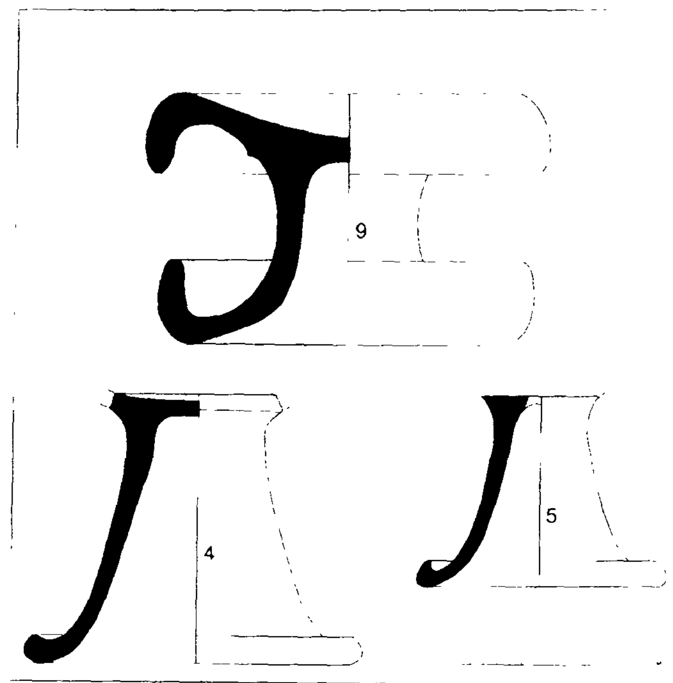


Fig. 5. Pottery Types, Red Ware, Sanauli, Dt Baghpat, U.P.

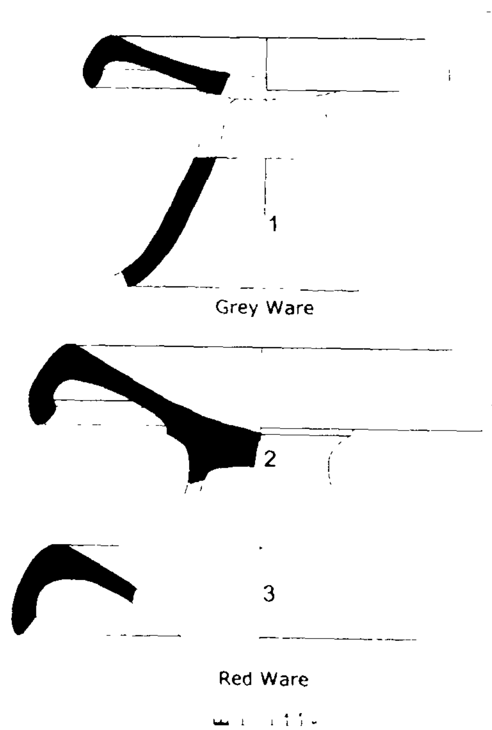


Fig. 6. Dish-on-Stand, Sanauli, Dt Baghpat, U P

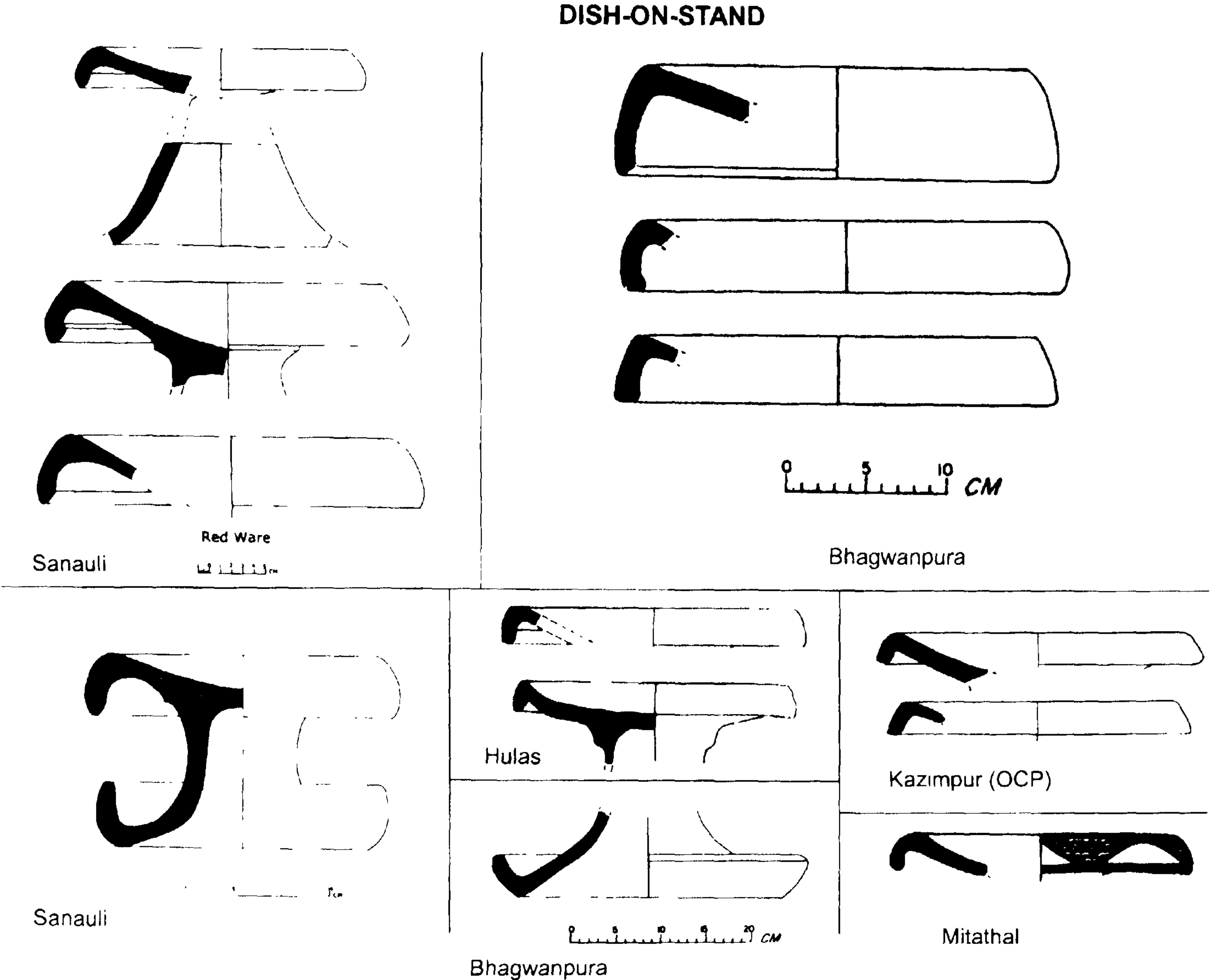


Fig. 7. Chart showing comparison of pottery types

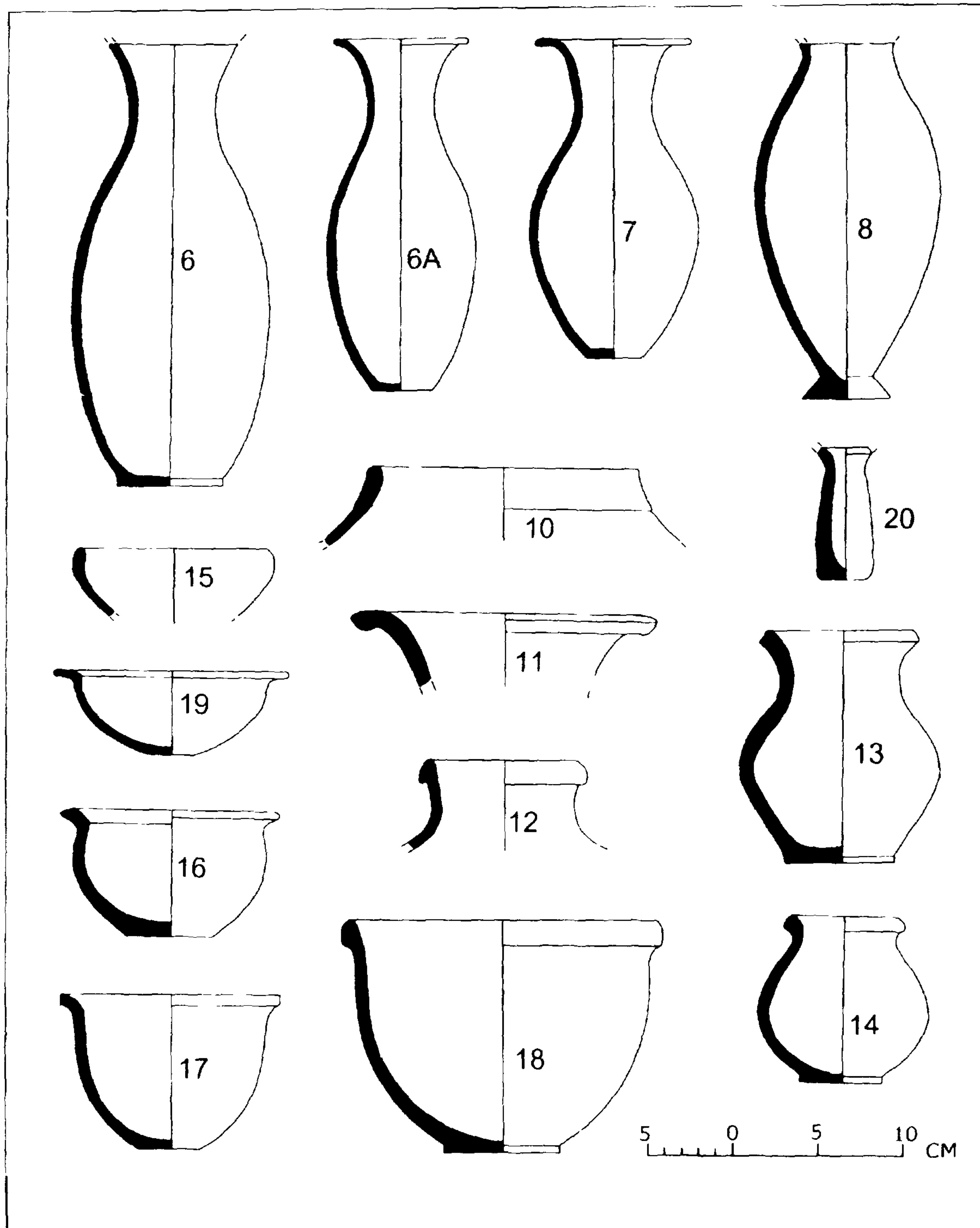


Fig. 8. Nos 6 - 8, Elliptical Vases, 10 - 12, Jars, 13 - 14, Lotas 15 - 18, Bowls, 19, Bowl-cum-lid, 20 and 26, Miniature Jar, Sanauli, district Baghpat, U P

Excavation at Juni Kuran: 2003-2004
A Preliminary Report

SHUBHRA PRAMANIK*

The ancient site of Juni Kuran (Lat 23°27′ N; 69°47′ E), located on the north-eastern corner of Pascham Beyt (Island) in taluka Bhuj, district Kachchh was first reported during the course of exploration carried out by a former Director General, A.S.I., Shri J.P. Joshi, in the year 1968-69. The site is situated about 25 km south of Indo-Pakistan border, and roughly 3 km north of the present-day village Kuran, locally known as originating from Kala-Dongar, nearly 3 km away, on the south-eastern side which is joining the Great Rann north of the present site.

Surface Configuration

The area around the mound is densely vegetated, consisting of pilol (Jhar), babul, beroes, kera, kunder and thorny shrubs of stunted growth. The settlement is roughly rectangular in shape and covers an area of 410 m x 350 m (Fig.2) with an average height of 7 m, approximately, from ground level. The north-eastern side, and the north-western side, rises to maximum height. Projections could be observed on all the sides of the periphery of the mound. The eastern side has a wide depression, created due to rains and rubble scatter. On the other hand, the south-western side of the mound shows mild depression. The inner side of the mound, having flat surface, has its edges demarcated by rubble and the area about 5 m away from south-western portion is still used by the people. There is a modern temple in use on the eastern side. The govt. sponsored relief work for the poor, has, however, caused destruction of structures/walls due to the construction of two check-dams and also with the movement of tractors in kaccha road. Adjacent to this dam, on the south-eastern side, could be seen a depressed area of 50 m diameter which is circular in form. It seems to be an ancient pond as is clear from the water-level marking on the periphery of the pond. As a whole, through a general survey of the site, it has come to our notice that water was certainly flowing around the site since there is depression of this kind. Another depressed area was observed on the north-eastern side covering an area of 20 to 25 m in diameter from the southern side of the mound. At a distance of 125 m from here there is another round mound with the remains of stone structures covered with thick vegetation. These features have been shown on contour map of the site prepared by taking readings at 1m intervals. The local fauna consists of rabbit dear, nilgai, fox. The site was favourable for habitation except for the water problem as there is today no perennial source of water. Bajra, beans, green grass, etc. are cultivated but the main occupation is cattle rearing.

The Legend of Kuran

The mound described above, being the highest hill in the region, 1,525 feet from MSL, is called Kalo Pahad

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(Black Mountain). It stands like a boundary wall in the south-east direction. It is believed that the heroine of the local Romantic love story of Karayat-Kapuri belonged to Kuran and after the death of her husband Karayat, she passed the rest of her life at the shrine of Rakhaguram Pachamiain on the Kala-Pahad.

Literary references of Kachchh

The earliest reference to Kachchh is probably in the Panini's *Astadhyayi*, meaning bank, shore, and *marg*. It is followed by *Mahabharata* (Dyuta Parva), and other works, like *Vayu Purana* and Jaina literature. Saka Rudradaman's inscription at Junagadh mentions Kachchh as a separate kingdom. Kachchh occurs in the separate list of countries conquered by him, along with Awasta, Lambha, Svabhra, Maru and Sindhu-Suvira. The *Kachchhun-Samskriti Darshan* refers that Abhiras of the Grace and Abhara stand for Kachchh: to be identified with Lower Sindh which is also refereed to by Megasthenes as 'Island of Patala'.

As far as the geography of this region is concerned, it may be noted that Ptolemy refer it as Kanthi, 'In the Syrasthrene on the Gulf of Kantha'. McCrindle referring to Gulf of Kantha says that the south coast of Kachchh is called 'Kantha', perhaps because of its shape with a narrow neck. The Periplus referring to Rann of Kachchh says that it was divisible into two parts, i.e., 'Greater' and 'Lesser'. It also describes it as unexplored, dangerous to ships, shallow and with violent eddies. However, the translation by Schoff makes the statement much more clear and understandable "Beyond the river Sindhu there is another gulf, not navigable, running towards the north; it is called Eirinon; its part small gulf and great; in both parts of the shore so that very often when the shore is not in sight, ships run around, and if they atle to hold their course they are wreaked".

The Chinese traveller Huiem-Tsang describes Kachchh in the south-west whose capital was Alor near Bhakar on the Indus. The identification of Otieh-po-chi with Alor in Sindh will mean that the traveller went to Kachchh through Sindh.

The Saraswati Project: Identification & Research on Lost Saraswati (Fig.3).

Recent research made on Satellite images has confirmed the existence of the Palaeochannels of the lost Saraswati River, which is a remarkable technological achievement. It is the earth observation data collected by Lansat, Rudarsat, Spat, JERS and IRS in polar orbit which have confirmed the existence of numerous dried up water-channels in the Indo-Gangetic plains. The one called Saraswati approximately followed the course of Ghaggar in Punjab, Haryana and Rajasthan as well as Hakra, Wahinda and Eastern Nara in Sindh.

The present project aims at conducting multidisciplinary study of the River Saraswati, stretching from the Siwaliks to the Arabian Sea, which includes the states of Haryana, Rajasthan and Gujarat and thereby formulating and implementing development programmes in the area by creating Hub-sites as centres of culture, tourism and good civil life. The multidisciplinary study includes archaeological, geomorphological, paleobotanical geotechnological, pedological, hydrological, ethnological, and other related disciplines, dealing with both past and present, and making a collection of oral and written traditions, etc. The present excavations form part of this project.

Objectives of the Project Comprises

(a) To define the River Saraswati and its tributaries in the basin.
(b) To identify special items of geo-technological studies.
(c) Conducting archaeological research by way of exploration and excavation in order to know the cultural sequence and specialized studies on ceramics, metallurgy, mineralogy, botanical and zoological remains.
(d) And to confirm the paleo-channel of the 'lost' Saraswati River, as per the Satellite Imaginary Data (Fig.3).

Plan and layout of Trenches

The layout of the trenches was followed from North-

western corner to North-eastern area by grid selection (10 x 10 m), from A1 to A35. However, only selected trenches were taken up for excavation of the Index Trench, i.e., T-16. Most of the trenches were laid in the southern side of the mound for excavation because they had revealed the existence of a gateway, and also other structures.

Excavation

The exploration and excavation of the site proved highly rewarding with unexpectedly rich evidence of structures like the two stadiums in a single complex. What is noteworthy is that within one season work, two other mounds, i.e., Kotdi I & II, were also taken up for trial excavation apart from the main Juni-Kuran which is located on either side of the bank of a local river, the former being habitation and the latter a burial site.

The Index Trench No. 16 was laid out in the citadel area of which only quadrant III was dug. The deposits of the following periods were encountered.

Period I-Mature Harappan with sub-phases, and
Period II-Late Harappan

The classification is, however, tentative since the lowest three meter deposit has so far not yielded pottery, etc., excepting for a mud-brick structure of 3 m height. As a result, another trench was laid to the eastern side of the citadel lower mound (residential area Y-24) in order to know the cultural deposit associated with the lowest levels of occupation (Fig.4).

Layer I: This layer is humus with an average thickness of 60 cm. It is dull brown in colour with sand, silt, clay, rootlets and stones.

Layer II: The thickness of this layer is 7 cm to 20 cm. It is differentiated on the basis of its brown colour. It has yielded potteries, antiquities and stones with silt and clay. The pottery included a variety of jars, miniature pots, perforated sherds, basins, dishes-on-stand and bowls. Dull red ware, both handmade and wheel-turned, with and without slip was found in majority.

Layer III: It is thick and is slightly compact than layer (2). It is deep brown in colour. It is composed of sand, silt, clay and *kankar* with potteries, antiquities, bones and stones. The deposit in this layer was marked in a sloping manner, i.e., from north to south. The deposit has yielded several shapes of perforated jars, basins, jars, bowls, channel handled pots (handmade) similar to Kalibangan II, consisting of dull red ware and buff ware with medium to coarse fabric, treated with red slip, and occasionally red ware having pink and ochre coloured surface, well fired with contents of sand, silt, mica and *kankar*

Layer IV: It is marked on all the sides of the quadrant in a sloping manner, i.e., from north to south, with a thickness of 50 cm. It is light reddish in colour, hard and compact in nature and contains potteries, antiquities, bones and handled cups, dishes-on-stand and basins with cord-impressions. The potteries consisted of red ware with and without slip, buff ware of medium to coarse fabric.

Layer V: The average thickness of this layer is 23 cm and is dull yellow in colour. It has yielded wheelmade red, grey and buff wares and treated with red ochre slip. The shapes comprise of jars, bowls, dishes and basins (Fig.5) having metallic sound. Some of the sherds have incised decoration consisting of horizontal bands, or chocolate colour painting on red ware (Fig. 6).

Layer VI: The maximum thickness of the layer is 17 cm, the contents of which are the same as that of layer 5 along with Reserve-slip of grey and red wares, and a few sherds of Rusticated ware.

Pottery

The pottery recovered from the excavation has brought to light a number of red wares. Besides the Reserved Slipped Ware, Cream Slipped Ware, grey ware and incised ware have also been found. A very rare pottery has been noticed, 'Ochre colour' ware with a fealing of wearing off. Among other ceramic wares, red

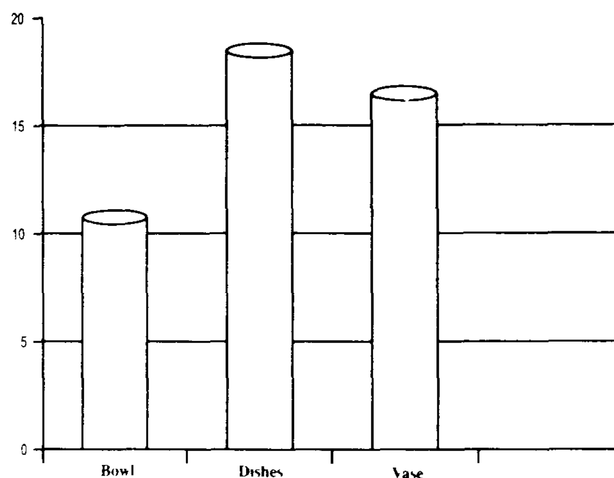
ware predominates which can be divided into following categories:

(i) Coarse red ware
(ii) Red slipped ware
(iii) Polychrome red slipped ware, painted in black and white.
(iv) Black painted red slipped ware
(v) Mica dusted Red ware.

Important types in red ware include perforated sherds, dish-on-stand, vase, *handi*, dishes, basin trough, ledged rim vessel and goblets, found from all levels.

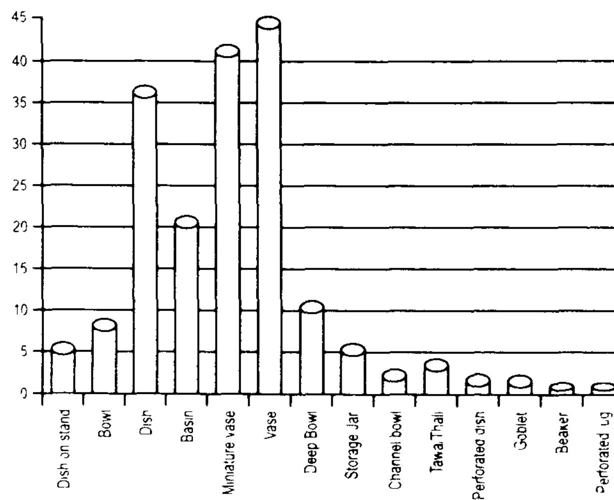
Ceramic Assemblage from Layer-2

- Bowl - 11
- Dishes - 19
- Vase - 17



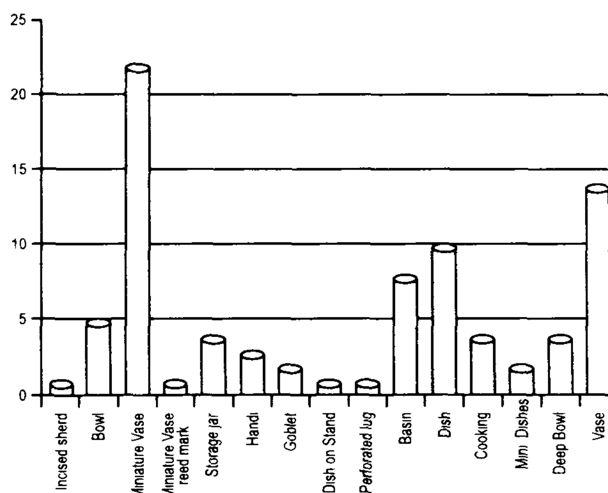
Ceramic Assemblage from Layer - 3

- Dish-on-stand - 06
- Bowl - 09
- Dish - 37
- Basin - 21
- Miniature Vase - 42
- Vase - 45
- Deep bowl - 11
- Storage jar - 06
- Channel Bowl - 03
- Tawa/Thali - 04
- Perforated Dish - 02
- Goblet - 02
- Beaker - 01
- Perforated lug - 01



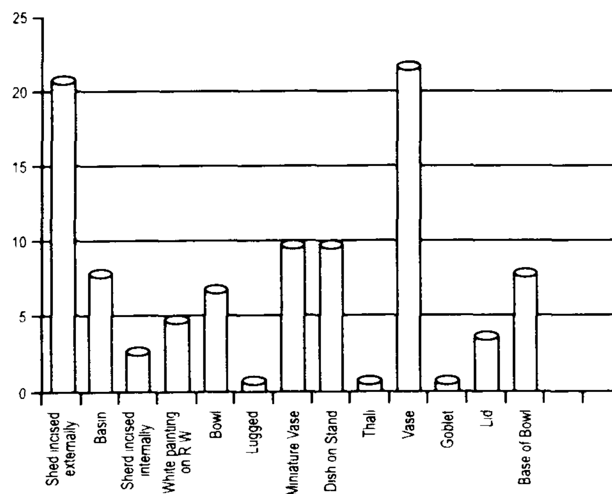
Ceramic Assemblage from Layer - 4

- Incised sherd - 01
- Bowl - 05
- Miniature vase - 22
- Sherd with reed mark - 01
- Storage jar - 04
- Handi - 03
- Goblet - 02
- Dish-on-Stand - 01
- Perforated lug - 01
- Basin - 08
- Dish - 10
- Cooking Vessel - 04
- Miniature Dishes - 02
- Deep bowl - 04
- Vase - 14



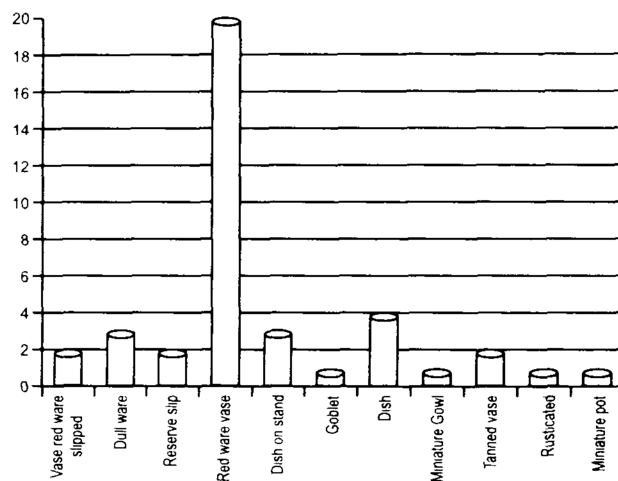
Ceramic Assemblage from Layer - 5

- Sherd incised externally - 21
- Basin - 08
- Sherd incised internally - 03
- White painting on red ware - 05
- Bowl - 07
- Lugged - 01
- Miniature Vase - 10
- Dish-on-stand - 10
- Thali - 01
- Vase - 22
- Goblet - 01
- lid - 04
- Base of bowl - 08



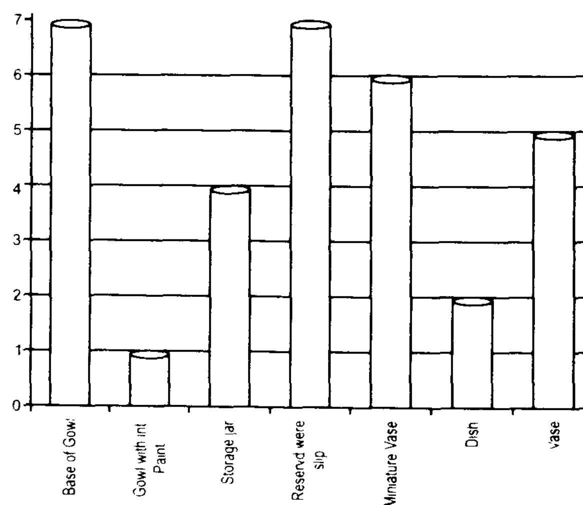
Ceramic Assemblage from Layer - 6

- Vase Red slipped with mica dusting - 02
- Black and White painting on dull red ware - 03
- Reserved slip ware sherd - 02
- Vase - 20
- Dish-on-stand in red slipped ware - 03
- Goblet - 01
- Dish - 04
- Miniature bowl - 01
- Tanned base - 02
- Rusticated vase - 01
- Miniature pot - 01



Ceramic Assemblage from Layer - 6A

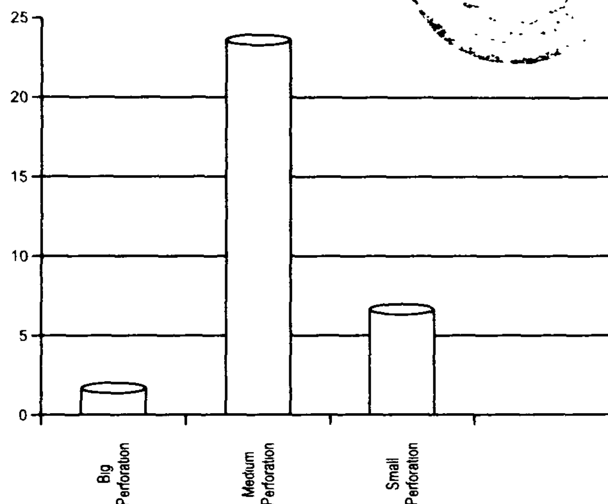
- Base of Bowl - 07
- Bowl with internal painting - 01
- Storage jar - 04
- Reserved slip ware - 07
- Miniature Vase - 06
- Dish - 02
- Vase - 05





Quantitative charts of Perforated sherds

- Big Perforation (**Layer 5**) - 02
- Medium Perforation (**Layer 3**) - 24
- Small Perforation (**Layer 3**) - 07



Reserve Slipped Ware with Paintings

The painting include horizontal bands, linear lines followed by horizontal bands, pepal-leaf (Pl. 1), palm tree/date-tree triangle loopes, etc.

Only four pot-sherds with incised decorations, impressing and combing have been found. These are rare and limited to the bottom of the dishes, appearing in the form of concentric circles or finger nail impressions in concentric bands.

Perforated Potsherds

From the Index Trench (No. T-16) nearly 33 perforated sherds were encountered from Layer (2) to (5), ranging in three different sizes, big, medium and small. From the Table shown below it is clear that perforated sherds of medium fabric are dominating. The thickness of the pots of the three fabrics ranged from 0.2 cm to 1 cm. (Fig.7)

Chart of Perforated Sherds from the Index Trench No. 16

Layer No.	Ware/Self-slipped/slipped	No. of sherds			Total
		Big	Medium	Small	
(2)	Red ware, self-slipped	Nil	3	1	4
(3)	Red wash	Nil	7	2	9
(3)	Red, self-slipped	Nil	3	4	3
(3)	Red, self-slipped	Nil	3	Nil	7
(4)	Red ware	Nil	2	Nil	2
(4)	Red ware	Nil	3	Nil	3
(5)	Red ware	Nil	3	Nil	3
(5)	Red ware	1	Nil	Nil	1
(5)	Red ware	1	Nil	Nil	1
	Total	2	24	7	33

Terracotta Cakes

From the Index Trench (No. T-16) a total of 309 terracotta cakes of red ware encountered, the shapes of which are triangular and oval, varying in three different sizes, viz. thick, medium and thin categories on the basis of size, shape and fabric. The frequency of the terracotta cakes unearthed from the layers 1 to 6A were of coarse fabric. The sizes of cakes ranged from 0.1 cm to 0.3 cm. From the table shown below it is clear that medium size terracotta cakes were dominating.

Table of Terracotta Cakes from Index Trench T-16

Layer	Shape	Ware	Content/Fabric Fabric	Thick	Medium	Thin	Total
(1)	-	-	-	-	-	-	-
(2)	Traiangular	Red	Coarse	6	-	5	11
(3)	Traiangular	Red	Coarse	11	41	31	83
(4)	Traiangular and Oval	Red	Coarse	2	9	7	18
(5)	Traingular	Red	Coarse	4	7	1	12
(6)	Triangular	Red	Coarse	53	75	7	135
(6A)	Traingular	Red	Coarse	22	27	1	50
	Total			98	159	52	309

Flora and Fauna

On flora and fauna, very little information is available as most of the samples are still under study. As far as the flora is concerned, charred wheat grains have been identified.

The presence of unbarbed fish-hooks, arrowheads, and spearheads of copper has been attested.

Since the excavation was limited, only 436 antiquities were encountered, the table of which is given in the antiquity section. Mention may be made of the highest frequency of bangle pieces in terracotta, followed by blades and beads.

STRUCTURES

Index Trench- No.16

Mud-brick and stone structures were observed continuously from the earliest level to the latest level. The average brick size was 40-42 cm in length, 20-22 cm in breadth and 6-8 cm in thickness.

STR-1: At a depth of 1.20 cm, in layer 3, were exposed partially covered drain which is having a vertical stone inside, measuring 18 cm, and horizontal small slabs, measuring 20 cm, placed seperately over it, oriented east-west.

STR-2: At a depth of 1.43 cm, in the south-eastern corner, two courses of parallel walls were noticed, measuring 150 cm, oriented north-south.

STR-3: A wall in the north, consisting of one course of stone, and running in east-west direction was found at a depth of 152 cm.

STR-4: Floor or platform, of paved stones of 6-10 cm size, was exposed in the north facing section at a depth of 180 cm in layer 6. The thickness of the stones varied from 3 cm to 5 cm. The contents of the flooring comprised of *kankar* mixed with clay.

STR-5: A mud-brick structure, running in north-south direction, appeared at a depth of 2.42 cm (Fig. 4). The width of the wall measures 1 meter. The other three sides of the wall are also of mud-bricks but their outer edges are not visible as they are inside the section; so the width is not know. The space between the walls is found filled with mud-brick materials as well as brickbats.

The height of the structure (platform ?) is almost 305 cm, having 40 courses of bricks, divided into 2 phases, one is 242-282 cm, i.e., 6A, and the latter one, below 4.82 cm, i.e., 6B. The soil and colour of the platform is entirely different from the soil on the outer side. The exact length and plan could not be determined as it is running in other trenches as well.

STR-6: At a depth of 5.17 cm, a single course stone wall was noticed in the south, facing section running in east-west direction. The mortar used for binding the structure was mud. For stone structures they used flat stones/rubbles of different sizes and laid in a particular direction. Hence, according to the structures and potteries observed in the Index Trench, after reaching the natural soil, the chronological sequence has been tentatively worked out as under.

Layer 1 to 5-Late Harappan
Layer 5 to 6A-Mature Harappan

I. Significant Discoveries: Gateway and Stadiums

Excavations at Kuran are important and significantly rewarding in view of the fact that no Harappan culture site was ever excavated in Khavda Island, covering an area of 3300 sq. km, with scientific method unfolding the remains of a fortified city with gateways, middle town, etc.

The fortification of the citadel was encountered during the course of our excavations in Trench AC-15 to AC-19 and AD-15 to AD-20. However, the exact dimensions of the citadel could not be determined because only the southern part of the citadel area was taken up for excavation. As Lothal is famous for its dockyard, Dholavira for its reservoirs, Mohenjodaro for its great bath, Surkotda for horse bones, so also Kuran will be known for two forms of Stadium, one for the common man and other for the elite, unearthed in Trenches AC,17-AD-17, AC-18-AC-19, AB-19. The details of the Stadiums are as under.

Stadium No.1

This stadium was located 2.60 m away from the 1st (Gateway) and 30 m from S-W corner of the bastion and is devoid of steps front side for entering. Interestingly, the stadium was approached from inside the citadel by Gateway No.2 constructed in a gradually receding manner (Pl. 2) from top to bottom, meant for the common people. Built of rubble and mud mortar, its extent height is 2.50 m with 22 courses, the lowest being 80 cm and 5 courses. The maximum length measures about 25.25 m and the minimum being of 24.75 m, and 8.25 m in width.

Stadium No.2

It was located on the eastern side of Stadium No. 1 and only 14 m away from the 2nd Entrance (Gateway). It was noticed at a much higher level than Stadium No.1. The length of the Stadium is 22.20 m and its width 14.50 m. The maximum height being 110 m and lower part being 64 cm, entered through 2nd Gate via the passage followed by 7 steps (Pl. 3). The stepped order of the citadel, passage and step-ways, leading to its nearby chambers, suggest the high status of the people who were its occupants as audience and visitors.

Interestingly, overlooking the stadium, and in between the citadel and structural remains of the lower town, towards the southern side of the citadel, there is an open ground, measuring 200 m x 50 m. It may have been used for communal gatherings, celebrations, ceremonies, functions, games, etc.

As far as the architecture is concerned, the stadium of Kuran of Pascham Beyt shows much development in planning and construction over its counterpart at Dholavira, which has been ascribed to stages III. Here it seems coeval with stage IV of Dholavira as the artifacts of Kuran resemble the antiquities from Stages IV and V of Dholavira.

It appears from the cultural contents and structures like stadiums, fortification wall, elegant pillars of Dholavira that Kuran is a counterpart of Dholavira. It fully supports the view that the Kuran Harappan not only

drew the ideas and inspiration of the settlement pattern but also were the migrants from Dholavira in Stage IV as the distance of Kuran from Dholavira through the Rann is only 42 km.

Urbanisation and formation of the city at Juran

The site of Dholavira citadel existed in the south and middle town in the north whereas we see at Kuran the citadel in the north followed by ceremonial, or congregation ground, in the south within the outer fortification wall, which shows system application of cosmic geometric plan in city planning. The orientation of the site, particularly along the cardinal directions, suggests not only the skill of the astronomers but also the apparent intent of ancient urban planning. For example, the stadium, which covered 200 m area, stood some 18 m from M.S.L. The site appears to have been a classic Harappan city with cosmic setting.

Based on the fact that the city of Juran played not only a significant role in forming socio-cultural contacts and integration but it was also responsible for the development of urbanization in the region of several other islands in the Rann of Kachchh through cultural contacts.

Fortification of Citadel and Gateways

The discovery of fortification wall on the southern side of the citadel (Fig. 8) during the course of vegetation clearance was significant. The citadel wall, measuring nearly 0.72 m x 92 m and outer fortification wall measuring 220 m x 225 m built of rubbles and mortar, have been recorded. On plan the citadel fortification is rectangular with a height of 7 m, width being 4.50 m, consisting of 15 courses. After the exposure of the fortification wall, the problem of locating its gateway arose. Near the south-western corner a drain/outlet channel was found. It emerges through the rubble stones at a point where no gate existed. In this uncertainty about the gate it was decided to take a trial trench in AC-16-17 and AB-16-17 on the western side at a point where a curved re-entrant in the line of defences suggested the possibility of an entrance or gateway. The gate along with the bastion, was discovered in the trenches mentioned above. This gateway (No.1) is approached from the outer side. It was also noticed that the gateway was entered through a narrow lane of 3.40 m width. From the architectural style also it was having three phases of construction belonging to different periods.

In the first phase, the original construction of the entrance gateway, of 6.42 m width, at a height of 18 m from ground level took place. In the second phase, the construction was made along the original gateway by erecting dry masonry of dressed stones of uneven shapes on either side of the entrance in the form of pillars raised on a single horizontal slab (i.e., door-still 250 cm in length and 19 x 24 cm in thickness up to a height of 2.90 m. The height from the present ground level to the level of the horizontal slab (door-still) is around 35 cm. Further, it is very interesting to note that the folks of this stage had deliberately erected structures for narrowing the inner gate for perhaps beautifying it in the form of giving simple design to pillars. In the third phase, the gateway was seen closed by erecting a wall of dry masonry stones (Pl. 4) and also by providing drain/outlet channel at the bottom erected on the horizontal slabs of the second phase (i.e., door-sill). The width of erected wall is 2.10 m. Overall, it was noticed from the section that the uneven stones of the fortification wall were encased with dressed stones externally.

The entrance of Gateway No.2 was traced in AB-18 which leads from the citadel to the stadium and then towards three different directions. On either side of the Gateway has a passage, measuring 5.50 m x 2.50 m with a flight of steps, leading to Stadium No. II. It has, however, a partition wall (150 x 90 cm). The digging of this area was done only upto 130 cm but will be excavated in future to obtain a clear picture.

Pillard hall between two Gateways

Excavation in between the two gateways was taken up in Trenches AB-17-AC-18. A chamber, measuring 10.5 m in length, 8.50 m in width, with a wall of 75 cm was exposed. It consisted of three opening (passage with a 'L' shaped partition wall. Passage No.1 leads to a flight of steps towards **Stadium No. II.** Passage No.2 leads straight towards **Stadium No.I**. The third passage turns towards the **Pillard hall**. The two pillar-bases, with tapering ends, with 32 cm diameter, and 105 cm perimeter was exposed upto a height of 18 cm. The second central pillar base of the hall is 39 cm in diameter (from perimeter 122 cm) with an exposed height of 10 cm only.

All the pillars were made of sandstone similar to the ones encountered at Dholavira. On the south-western corner of this hall is an inlet channel of the drain that discharges at the projection wall of the first entrance, gateway no. 1. The excavation, up to 55 cm only, has yielded terracotta objects and chert blades. The strategic location of the room sophisticated construction of pillar base, staircases over the fortification wall, etc. indicate the status of its occupants.

Second chamber to the east of second Gateway

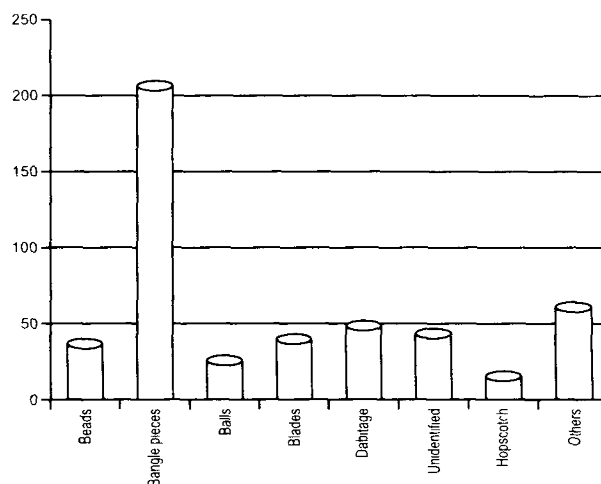
The excavation in Trench AB-18 brought to light the second gateway, partially enclosed, forming a chamber like structure measuring 6.50 m x 4.20 m. The thickness of the wall varies from 115 cm to 70 cm. Its entrance is from the south-eastern corner. Over it has fallen architectural members of the door-lintel. This chamber was dry upto 35 cm, because of which its functioning is so far uncertain.

Antiquities

During the excavations 436 antiquities have been found. Among them terracotta bangles and shell objects predominate. Some of the bangle-pieces of terracotta have painting on them in chocolate and white colours. The beads are of steatite, carnelian and serpentine. There are typical Harappan disc beads of steatite (Pl. 5). There are also various types of shell inlay pieces, blades of various stones and copper objects like arrowheads, wire, fish-hooks, etc. A few weights have also been found. The terracotta objects include animal figurines, balls, hopscotch, etc. The table shows the frequency of objects period-wise.

In Period I all the forms of Harappan Black-on-Red ware are present except for the goblets. The typical "Mother Goddess" figurines are also absent. However, crude terracotta anthropomorphic forms do occur.

In the Harappan red ware some forms are similar to that of Kalibangan, such as the feeding-bowl (Fig.9.). The white painted pot-sherds and Reserved Slip Ware shapes resemble those found at Dholavira, Lothal, Surkotda and Prabhas Patan. The study of Period-I ceramics shows that although predominantly it was the Mature Harappan pottery, it was associated with certain pottery traditions of



the Early Harappan types. The antiquities are also typical Harappan such as the terracotta cakes, shell bangles, perforated potsherds, cart frames, sling stones, terracotta balls, saddle querns, copper bangles, spearheads (Fig. 10) fish-hooks, carnelian beads and long ribbon flakes of chert and terracotta anthropomorphic forms.

As far as the architecture is concerned, it includes fortified citadel, residential houses, systematic drains, pillared halls and stadiums. And the use of standard size of mud brick in the ratio of 1:2:4.

BURIAL

Trial Excavation at Kotda and Kotdi-I

Apart from documenting cairn circles located on the north-eastern terrace outside the outer fortification wall, excavation was taken up in two localities, one in the fortified area (nothern side of the citadel), and the other at Kotdi-II, 2 km south-east of Juni Kuran in order to study typology as well as to know its relation with the other sites Out of eight cairn circles located outside the fortification, only one cairn circle was taken up for excavation, in Trench 15 in the lower terrace The diameter of the circle is 3.20 m, and it is found raised to a height of 60 cm. The cairn consists of undressed stones enclosing loose earth. The cairn was finally covered with small flat stones. The grave consisted of extended burial with few pieces of coarse red and also grey ware sherds.

The burial was laid in east-west direction, the head facing north.

Here a unique feature was observed a tail like structure of rubbles was found joined with the cairn. It measures 16-30 cm in width and 16-20 m in length. It is almost touching the edge of the periphery of the cairn circle in the form of 'S', the reason of which is not known.

The second cairn circle was excavated at **Kotdi-II** in Trench G/9, Burial No. 1. The aim was to know its relation with that of Kotda-Kuran cairn circle located on the other side of the seasonal Kuran Nala. It is 10 m wide and is located on a hilly terrace. The site covers an area of 700-800 m. On the other side of the slope as well as on the bank of the Nala was observed another habitational site, called **Kotdi-III**. In an area of 400 x 280 m (N-S), some circular structures, measuring 3 m in diameter, were located. These were to be related to the burial site. Out of two dozen cairns, only one cairn-circle was opened. It was found to be oval on plan, 8.5 m N-S and 6.90 m E-W. Besides cairn circles, rectangular cairn/or house-plan, measuring approximately 2.50 m, was also noticed around the cairn burial. The cairn appears to be similar to that found at Sar-i-Asiah in Baluchistan (Fig.11). During the excavation a rectangular chamber was noticed under the heap of cairn stones at a depth of 0.60 cm (Fig. 5). It has an entrance from the western side. It is 60 cm in width. The thickness of the sidewalls measured 0.70 cm. In one of the quadrants, during the course of excavation, painted sherds of vases and a few charred bones mixed with ashes were found inside the burial chamber. The chamber measured about 2.77 x 3.10 m with five courses of stones. It was found divided into two parts by a line of stones along the east-west axis. The grave goods consisted of shells of uniform size, perhaps representing something in symbolic form. It is significant to note that the habitation site **(Kotdi-III)**, on the other side of the Nala, has yielded similar types of painted pot-sherds (Fig.12). It therefore, shows that both the sites are interrelated, one was the habitational area and the other was the graveyard.

Documentation of Cairns along Juni Kuran Slopes

Nearly 1 km N-E, parallel to the citadel at Juni Kuran, but outside the outer fortification wall, there is a flat terrace consisting of cairn-circles, measuring 2 m to 3 m in diameters. It appears to be the burial site of Juni Kuran. Mircoliths and plain red ware were found in this area. Everything was documented.

Conclusion

To sum up, the present excavations at Juni Kuran have shown that it was a typical Harappan township of the Mature Period. It has a citadel, two stadiums and a pillared hall, reflecting the picture of Dholavira. The same impression one gets from some other structures also found here, such as the Gateways, drains and mud-platforms. It may be mentioned here that the Mature Period remains were succeeded by Late Harappan materials.

Whether there was an Early Harappan settlement here or not is a moot point since the lowest 3 m deposit has so far not yielded antiquities.

Apart from these excavations, exploration was carried out with the help of satellite imagery showing some palaeo-channels. Nearby a dozen of ancient sites have also been located.

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Fig. 1. Indus Sites in Gujarat

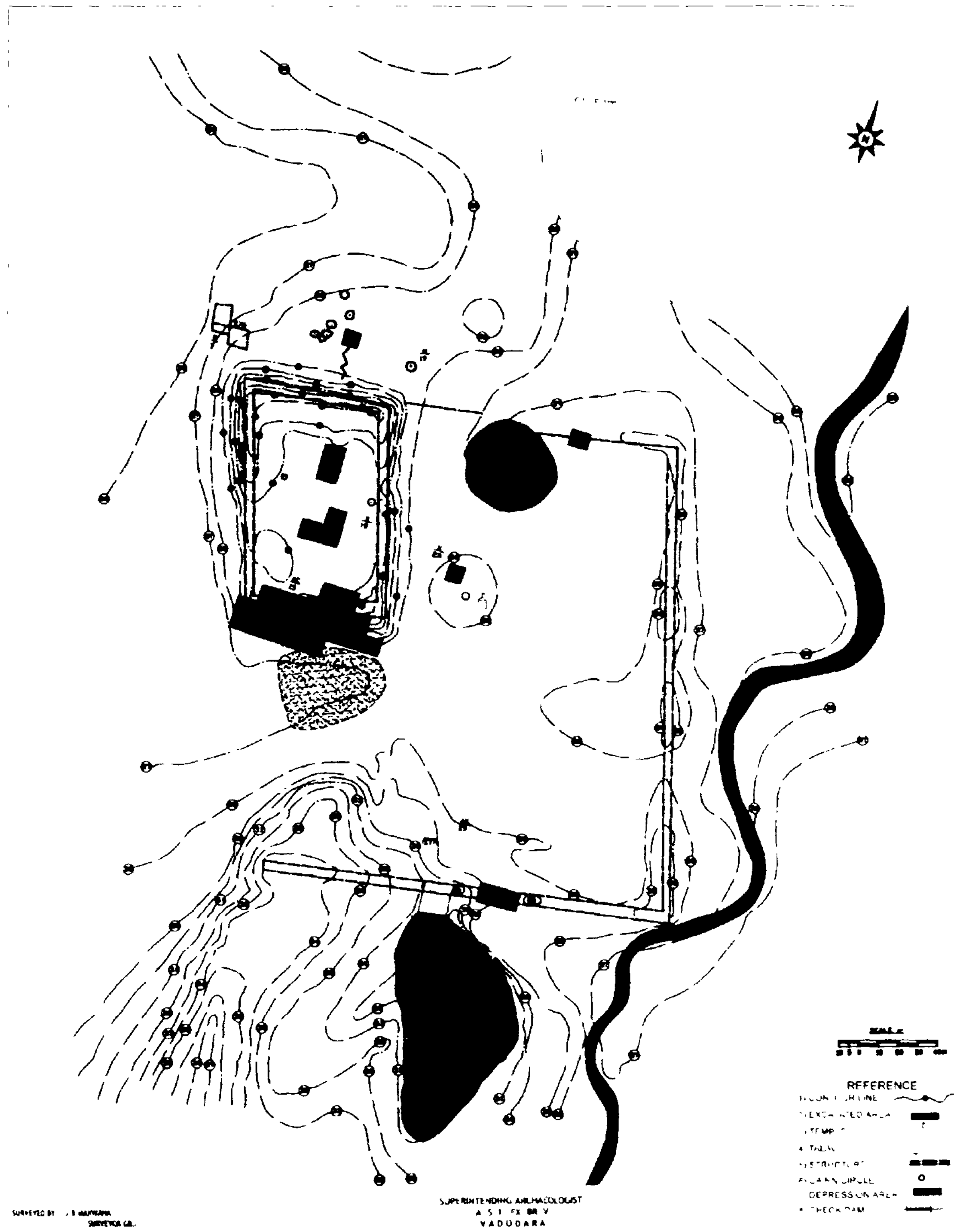


Fig. 2. Kuran : Drawing showing the mound & the excavated area at Kuran-2004

EXPLORED SATELLITE VILLAGES/ SITES IN PASCHAM ISLAND WITH SATELLITE IMAGERY DATA

RANN OF KUTCH

GREAT RANN OF KUTCH

KOTDA (KRN)

REFERENCE

VILLAGE

SITE

RIVER

SCALE

J.B Makwana

Fig. 3. Kuran : Satellite Imagery data of Pascham Island Showing Paleo-channel & ancient sites

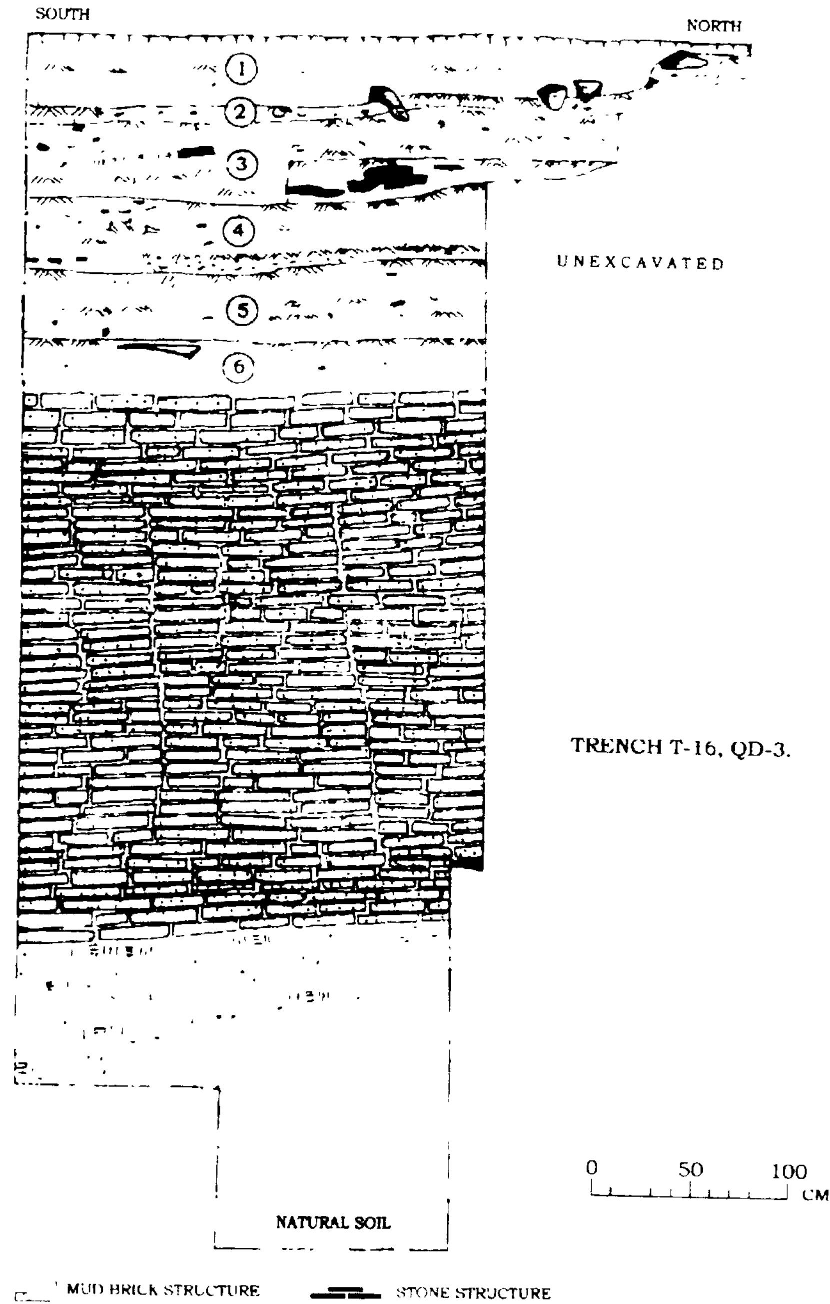


Fig. 4. Juni Kuran 2003-04 Section Facing East

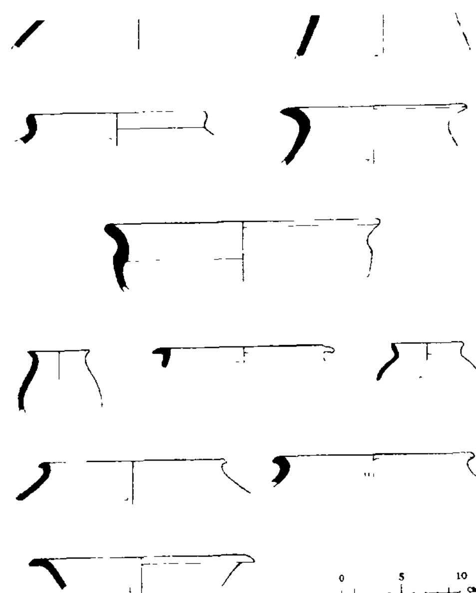


Fig. 5. Kuran : Potteries of Phase II

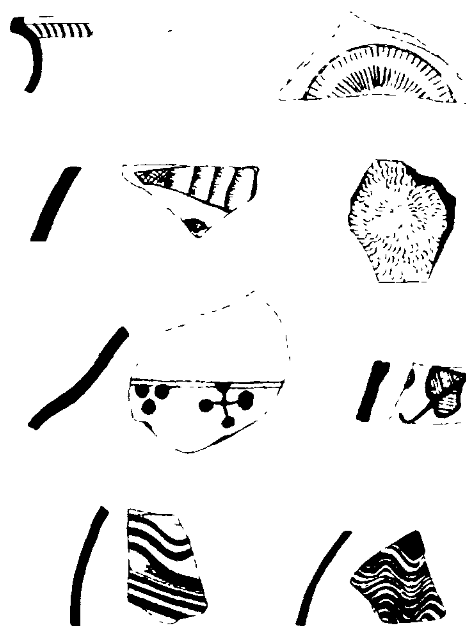


Fig. 6 Kuran : Painted Incised, Reserve slipped sherds (Phase-IA)

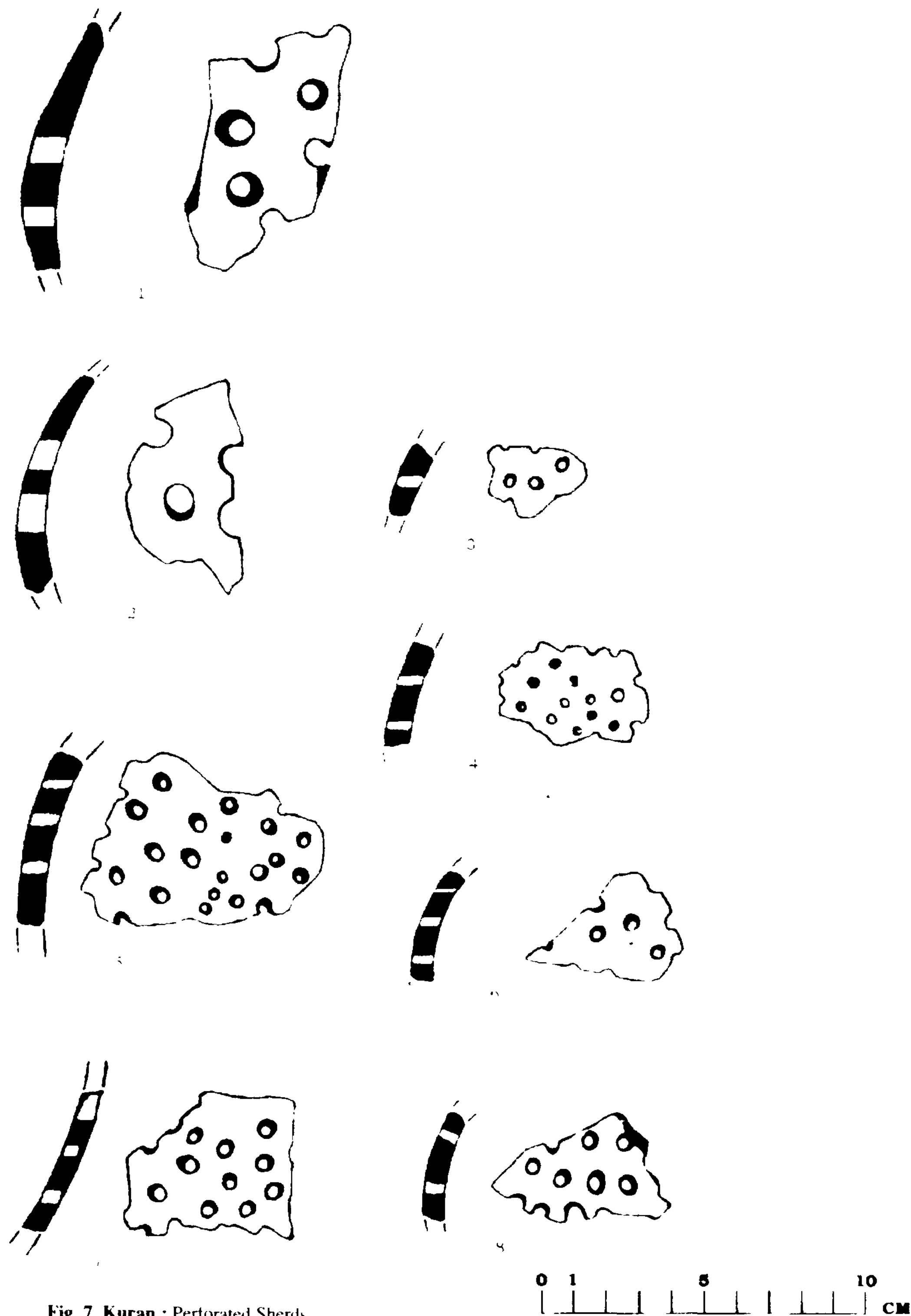


Fig. 7. Kuran : Perforated Sherds

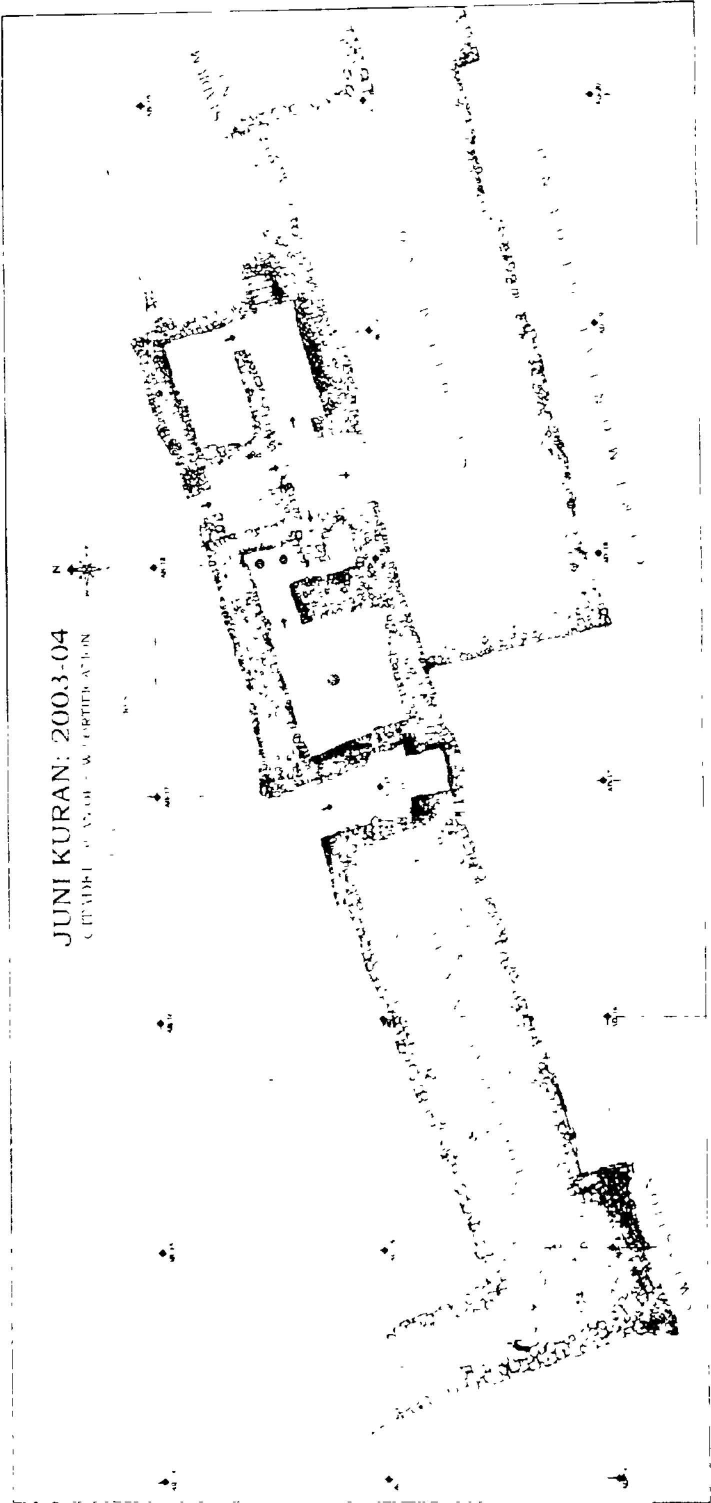


Fig. 8. Kuran : Harappan fortification, and associated structure in South-West



Fig. 9 Kuran : Feeding bowl of Phase I

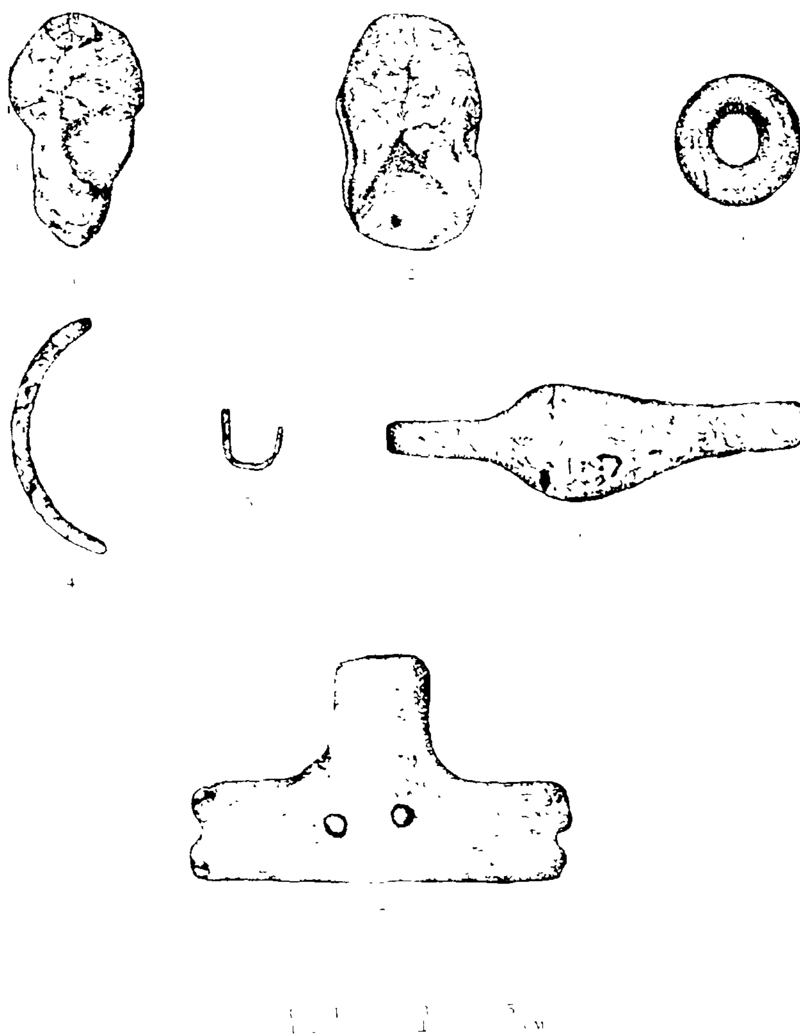


Fig. 10. Kuran : 1 Terracotta Mustica 2 Terracotta Anthropomorphic form 3 Terracotta Spindle whirl 4 Copper Bangle Piece 5 Copper Unbarbed Fishhook 6 Copper arrow Band 7 Terracotta Toy Cart

Fig. 11. Map showing the distribution of Cairn Circle

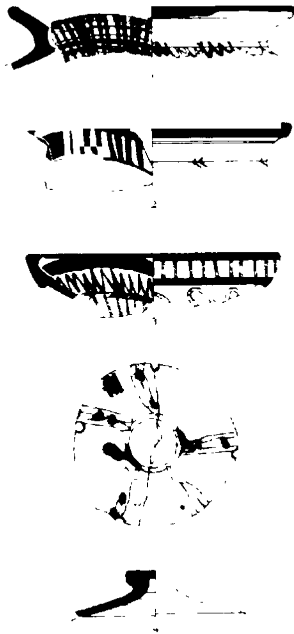


Fig. 12. Kuran : Polychrome Potteries from Kotdi III

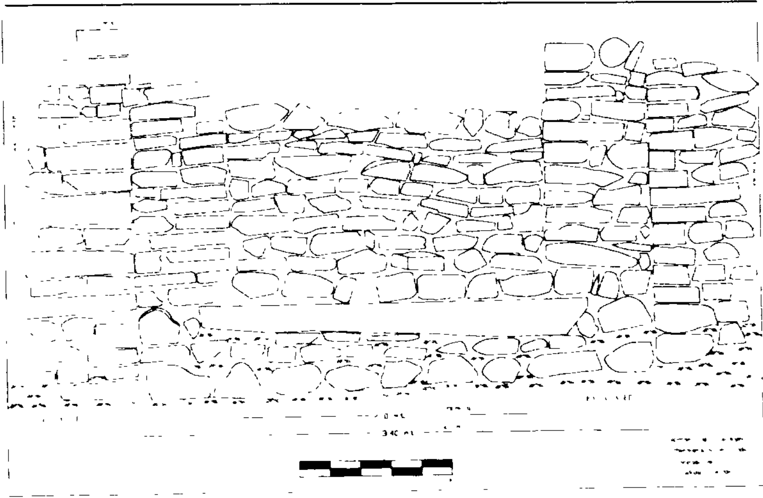


Fig. 13. Elevation of the South-Western Gateway

Important Discoveries of Prehistoric Rock Paintings, Ancient Inscriptions and Stone Age Tools in Southern Bihar And Adjoining Jharkhand

A.K. PRASAD*

The southern region of Bihar, mainly for this paper, is Magadha region which is well known for its great historical & cultural heritage. Absence of prehistoric paintings in this region put a big question mark, especially when existence of such paintings was already reported from the neighbouring states of U.P., Orissa, M.P. and some north-eastern regions. The riddle was ultimately solved when three rock shelters containing prehistoric paintings were discovered by us in the extremely remote, inaccessible and dangerous forested hills of Ranigadar (a tribal village in Kowakol Block of Nawada district, Bihar) during the winter season of 1993-94. This breakthrough came after several years of unsuccessful explorations in the past.

Eleven more rock shelters/caves containing prehistoric paintings were discovered in the adjoining region during the next winter season of 1994-95. Two more expeditions were carried out in this inaccessible terrain during the summer seasons of 1996 and 1997 with the support of the Indian Army. No further expeditions could be undertaken by me thereafter due to a serious leg injury during the last stage of the 1997 expedition. A total of 86 rock shelters/caves containing prehistoric and historic paintings as well as inscriptions have so far been discovered in this region forming part of Nawada and Jamui districts in Bihar and the adjoining districts of Giridih and Kodarma in the recently created Jharkhand State.

Besides these, 10 open rock surfaces containing rare engravings and inscriptions, 13 Stone Age tool factory sites, 4 megalithic sites and some important Buddhist antiquities have also been discovered in the same region.

The area of discovery lies between Latitude 24°40′ to 24°53′ North and Longitude 85°41′ to 86°7′ East in the northern foothills of the Chota Nagpur Plateau.

Geographical Features

Geographically, this region lies in the north-eastern part of the Chota Nagpur plateau- the northern extension of the Vindhyan ranges. There are several folded hill ridges running east to west with narrow valley and tanrs (uplands). Elevation of the hill-tops varies between 300 meter and 673 meter. The entire area is hilly and densely forested drained by the south-north flowing Kieul and Sakari rivers and their tributaries. Besides several seasonal nallahs flowing in different directions, there are numerous perennial water points and springs providing water to the tribal population as well as the wild animals throughout the year.

The principal rocks of this region are granite, gneiss and schist with occasional quartz, quartzite and chert.

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Climate of this region is typical monsoon type. Normally the monsoon starts around 15 June and continues till September. Winter season is mild and generally pleasant during the day. The summer season is dry and very hot.

The area is a tribal belt and very thinly populated. The Santhals are the main inhabitants. On the periphery of the forest are small villages of Bhullas/ Kharwars and Ghatwars. Birhores in small bands can also be seen moving from one place to another.

The archaeological wealth of this region can be put in the following four categories: -

(a) Rock Art,

(b) Ancient Rock Inscriptions,

(c) Stone Age Tools,

(d) Buddhist/Jain and other ancient antiquities.

The above sites are located in a hilly forest across the region of two hill ranges running from east to west, spread over an area of approx. 40 km x 25 km (as the crow flies). This area falls under four districts of two different states, Bihar and Jharkhand. Most of the above mentioned archaeological wealth, except the engravings is located in the Nawada and Jamui districts of Bihar and Giridih district of Jharkhand. Distribution of these sites is given below (Table 1).

From the chart below it is clear that the main concentration of the rock paintings and palaeolithic industries is in the areas forming part of Nawada district followed by Jamui district in Bihar and Giridih district of Jharkhand while that of the engraved open rock surfaces in Kodarma district of Jharkhand State (Table 1).

Documentation of the Painted Rock Shelters/ Caves/Open Rock Surfaces

Out of 96 such sites so far, 86 rock shelters/rock surfaces have been meticulously documented. These have been divided into 18 geographical/topographical areas (I to XVII and XXV). Each area has further been subdivided into clusters or group of shelters named alphabetically, i.e., A, B, C, etc. Within each group the individual shelters/caves/open rock surfaces have been numbered i.e., 1, 2, 3, 4, etc. Thus each painted/ engraved rock shelter/open rock surface has a three-tiered number written on the wall/adjacant surface in black paint, for example, XVI.A.7. In doing so I have followed V.S. Wakankar's system of classification initially adopted by him in the Bhimbetka region (Wakankar, 1976).

Table 1 : Distribution of Archaeological Sites

Ser No.	Type of Archaeological site	District-wise distribution				Total	Remarks
		Nawada	Jamui	Giridih	Kodarma		
1	Painted Rock Shelters/caves	44+6*	25	5+6*	--------	86	*Not yet Documented
2	Engraved open rock surfaces	-	-	-	09+1*	10	*Rediscovered Originally discovered by Cunningham
3	Stone Age Factory	09	03	01	-	13	
4	Megalithic Sites	03	01	-	-	04	
5	Ruins of ancient cities, monasteries, etc	03+1	01	-	-	05	

Table 2 : Distribution of the Painted Rock Shelters/ Caves and Engraved open Rock Surfaces

Ser No.	Name of geographical area, nearest village, place, District / State	Painted Rock shelter / Engraved	Location with specific name, if any Rock Surface	Date of Discovery	Remarks
A	B	C	D	E	F
1	**Geog. Area-II, Jharwana Complex (District Nawada, Bihar).**	II A.1	Karma Tanr Protected Forest, 'Khiria Gachha", north-east of Jharanwa village	11 06 1996	Small multi- storey shelter with Upper Palaeolithic / Mesolithic Paintings, heavily patinated
2	-do-	II A 2	Karmatanr PF, 'Ainta Pakkhal' north of village Jharwana	17 06 1996	Small shelter containing symbols & inscriptions
3	-do-	II.A 3	Karmatanr PF, north-west of Jharnwa	13 06 1996	Medium size R S Figures of a man with extended 'Koya Pakkhal', hands and feet, symbols etc.
4	-do-	II A 4	Karmatanr PF, 'Bara Kolwa' north of Jharnwa and south-west of village Karmatanr	27 04 1997	Very faint figures of symbols, reptiles etc Palaeolithic tools recovered from the shelter / locality
5	-do-	II B 1	Deep inside Karmatanr PF, north of Jharnwa and north-west of Karmatanr village	13 06 1996	Faint Figures of a frog like man with upraised hands, symbols, etc Stone Age tools recovered from surrounding area
6	-do-	II C 1	North-west of Jharnwa village	11 06 1996	Badly faded human figures
7	**Geog. Area-II, Jharanwa, Complex (District Nawada, Bihar).**	II C 2	'Pakkhal Pania' north-west of Jharnwa.	31 12 1994	Small but very important rock shelter Very clear hunting, dancing scenes with many symbols
8	-do-	II C 3	-do-	31 12 1994	Symbols, animal figures with long necks
9	-do-	II C 4	-do-	31 12 1994	Small shelter with faded figures of humans and animals
10	-do-	II C 5	Left the Ranigadar-Jharnwa Track -approx 1 km south west of RS II C 2	03 01 1995	Smallest cave containing figures of animals humans, symbols, etc

11	**Geo. Area II, Karmatanr Complex (Distt. Nawada, Bihar).**	II D.1	Karmatnr P.F., west of Karmatanr village.	10.07 1996	Small shelter with faint figures, symbols.
12	-do-	II D 1.	Forest east of Karmatanr village	05 05 1997	Medium size cave containing Upper Pal / Early Mesolithic tools. Faint figures of anthropomorphs, intricate designs etc
13	**Geog. Area III Ranigadar (East) Complex (Distt. Nawada, Bihar).**	III A 1	Ranigadar P.F., "Kohabarwa, north-west of Ranigadar vllage and 100 m north of the Ranigadar-Jharnwa track.	22 01.1994	1st rock shelter discovered Contains Chalcolithic tools and historic paintings depicting symbol, horsemen, geometrical designs Bone pieces and potsherds recovered from behind the shelter. A prominent water-hole in vicinty
14	**Geog. Area III Ranigadar (East) Complex (Distt. Nawada, Bihar).**	III A 2	Ranigadar P.F., 1 5 km norht-east of R S III A.1. Site locally known as "Khirkiya" or "Kamal Bharti".	31 12 1994	Small but important shelter containng a large number of inscriptions in Kharoshti, Kharoshti-Brahmi and some early historic paintings. Stone Age tools recovered from the shelter/surrounding area
15	-do-	III A 3	Ranigadar P.F, North-west of RS III A 1	22.01 1994	Small shelter containing a few very faint figures & inscriptions
16	-do-	III B 1	East of Ranigadar-Lalpur track.	17 07.1996	Huge cave containing faint human and animal figures and symbols Mesolithic tools made of quartz & crystal recovered from the cave
17	**Geog. Area IV, Ranigadar (West) Complex (Distt. Nawada, Bihar)**	IV A 1	Ranigadar P F, North-west of the Ranigadar village (west) on top of a hillock	18.06 1996	A huge shelter having four compartments facing north, south, east and west Contains a large number of Brahmi and Kharoshti-Brahmi inscriptions and figures of reptiles, insects, flowers etc
18	-do-	IV A 2	Adjacent to IV A 1	18 06 1996	Large cave containing faint figures of humans, peacock and a fire place
19	-do-	IV A 3	300 m north-east of R.S IV A 2	18 06 1996	Very faint symbols etc
20	-do-	IV A 4	Next to R S IV A 3	18 06 1996	Some very faded figures
21	**Geog. Area IV, Ranigadar (West) Complex (Distt. Nawada, Bihar)**	IV A 5	Next to R S IV A 3	18 06 1996	A few faded figures
22	-do-	IV B 1	On a hillock south-west of IV A 3	18 06 1996	Small rock-shelter containing only two symbols

23	-do-	IV C 1	On a hillock between RS IV A 5 and IV A 5 and IV B.1 Area locally known as "Giridha"	19 06 1996	Shelter contains only one faded symbol
24	**Geog. Area V, Dania Complex (Distt. Nawada, Bihar)**	V A 1	'Amba Pani', north of Dania-Ranigadar forest track	13 06 1996	Shelter contains only one faded figure but the nallah in front of it is rich in stone age tools
25	-do-	V.B 1	'Sahiya Sung', north of Dania-Ranigadar forest track	15 06 1996	Small circular shelter having some faded figures and hunting scene
26	-do-	V C 1	'Hariakola', North of Dania Ranigadar forest track	07 07 1996	Only one faded symbol visible
27	**Geog. Area VI, Sokhodewara Complex (Distt. Nawada, Bihar)**	VI A 1	South of the Jogia Hill approx 3 km south-west of Sokhodewara village	02 01 1995	Huge rock shelter cum cave used by Buddhist monks as Monastery Contains couples and large number of paintings and ancient inscriptions Some mesolithic tools, bone pieces and plenty of potsherds recovered from the shelter
28	-do-	VI A 2	300 m east of RS VI A 1	07 07 1997	Contains faded figure of chakra and also 15 cup marks
29	**Geog. Area VI, Sokhodewara Complex (Distt. Nawada, Bihar)**	VI B 1	Approx 2 km south of RS VI A 1 on top of a hillock	15 07 1996	Used as monastery Ceiling nicely decorated with red and white strieps Walls made by sun-baked bricks
30	-do-	VI C 1	'Dheria Baba' approx 3 km south-east of village Sokhodewara on slope of a hillock north of Sokhodewara-Dania forest track	22 07 1996	Only some faded figures visible
31	-do-	VI C 2	Approx 80 m west of VI C 1	22 07 1996	Only some faded figures visible
32	**Geog. Area VII, Nawadih Complex (Distt. Nawada, Bihar)**	VII A 1	Nawadih P.F., left of Nawadih Bajania forest track	23 04 1997	Small shelter with some faded figures
33	-do-	VII A 2	Open Rock Surface VII A 1 0	23 04 1997	Persian inscription
34	-do-	VII B 1	Approx 1km south-east of VII A 1 in 'Bathan' area	23 07 1997	Footprint engraved on roof of the cave Classification number not given

35	**Geog. Area VII, GhutiaComplex (Distt. Giridih, Jharkhand)**	VIII.A.1	Deep inside the forest just below the top of a hill south-west of village Ghutia	21 06 1996	Huge cave containing several faded paintings Tracing and videography of this shelter has not yet been done
36	**Geog. Area IX, Ghasani Complex, (Distt. Giridih, Jharkhand).**	IX A 1.	Deep inside jungle south-west of village Ghasani		Huge cave containing a large number of paintings and inscriptions
37	**Geog. Area X, Lalpur Complex (Distt. Nawada, Bihar).**	X A.1	'Darika'. Deep inside the Protected Forest south of village Lalpur	20 07 1996	Small shelter having 23 figures of dancing humans wearing animal masks
38	**Geog. Area X, Lalpur Complex (Distt. Nawada, Bihar).**	XB.1	'Bhulla Baithan', east of X A.1 and south of village Sirlohi	21 07 1996	A major rock shelter containing more than 46 figures of hunting & dancing scenes, reptiles, symbols, etc
39	**Geog. Area XI, Devasthan Hills (Janamthan) (Distt. Jamui, Bihar).**	XI A 1	North of the Janamthan Gidheshwar track The site is locally called 'Garainthwa'	05 07 1996	Huge shelter containing some, cupules and a large number of paintings These include hand-in-hand dance, a big bird, snakes, animals, humans and intricate deigns/symbols Stone Age tools, bone pieces and potsherds recovered
40	-do-	XI A 2	North-east of XI.A.2 Site known as 'Bhains Ghirwa'	04.05 1997	Faded figures of humans, lizard, symbols and intricate designs, etc
41	-do-	XI A 3	East of XI A 2	04 05 1997	Faded figures of man with raised hands and a symbol
42	-do-	XI B 1	South of the Janamthan Gidheshwar hill track, on the ridge West of the Dewasthan Pathar Peak Site locally known as 'Hadhadava'.	05 07 1996	A major rock shelter containing a very large number of intricate and geometric designs, also humans, animals, *Matridevi* and symbols Palaeolithic and Mesolithic tools, bones and pot sherds found in and around the shelter
43	-do-	XI B 2	Approx 100 m south-east of XI B 1	17.06.1997	Small shelter contaning some faded symbols and inscriptions
44	**Geog. Area XI, Devasthan Hills (Janamthan) (Distt. Jamui, Bihar).**	XI C 1	Approx 100 m north of Janamthan-Gidheshwar forest track Locality is called 'Jeri'	05 07 1996	Two clearly visible rectangles contain figures of humans, animals, three suns, a wizard and some geometrical designs
45	-do-	XI C 2.	200 m north of the forest track Locality is called "Mahua Kola"	24 05 1997	Huge but shallow shelter. Most of the figures destroyed/faded A big wizard with upraised hands and some intricate designs
46	**Geog. Area XII, Taraun Complex (Distt. Nawada, Bihar).**	XII A 1	North-eastern portion of Mahant pahari	12 07 1996	A cave containing only one big chakra (set of concentric circles)

47	**Geog. Area XIII, Pihra Complex (Giridih District, Jharkhand)**	XIII A 1	'Kohbarwa', north-west of the village Jamuniadih (Pihra)	02.07.1996	Contains some very faded intricate designs/symbols.
48	**Geog. Area XIV, Rajabar Complex (Distt. Kodarma Jharkhand)**	XIV A 1	Deep inside the Rajabar Protected forest	03.06.1996	Very rare engraved figures of humped bulls and other animals on a huge boulder
49	**Geog. Area XV, Dudhapani Ghat (Mirgani) Complex (Distt. Kodarma, Jharkhand).**	XV A 1	Dudhapani Ghat in the forest, north-west of village Mirganj	21.04.1997	Engraved Brahmi inscription on open rock surface
50	-do-	XV A 2	-do-	21.04.1997	Engraved figure of Buddha protected by Muchalindi Naga on a boulder
51	-do-	XV A 3	-do-	21.04.1997	Engraved figure of a decorated elephant
52	**Geog. Area XV, Dudhapani Ghat (Mirganj) Complex (Distt. Kodarma, Jharkhand)**	XV A 3(a)	Dudhapani Ghat, In the forest north west of village Mirganj	21.04.1997	Engraved Brahmi inscription
53	-do-	XV A 3(b)	-do-	21.04.1997	Engraved Geometrical design on open rock surface
54	-do-	XV A 4	-do-	21.04.1997	Faint engraved figure of a running elephant
55	-do-	XV A 4(a)	-do-	21.04.1997	Engraved figure of a deer
56	-do-	SV A 5	-do-	21.04.1997	Rediscovered. Originally discovered by Cunningham and reported by Kielhorn in 1894
57	-do-	XV A 6	Spur of a hill approx 1.5 km west of XV A 5	21.04.1997	Brahmi inscription on open rock surface
58	**Geog. Area XVI, Gidherwar-Gambhira Hill Ranges Complex (Distt. Jamui, Bihar).**	XVI A 1	Flat hill range top between Devasthan Pahar Peak and Gidheshwar Peak north of Garhi village	29.04.1997	Some faded figures
59	-do-	XVI A 1(a)	East of XVI A 1	29.04.1997	Huge shelter with some faded figures
60	-do-	XVI A 2	Next to XVI A 1(a)	29.04.1997	Some faded figures
61	-do-	XVI A 3	Adjacent to RS XVI A 2	29.04.1997	Has some geometrical designs, Matridevi, etc

62	**Geog. Area XVI, Gidherhwar-Gambhira Hill Ranges Complex (Distt. Jamui, Bihar).**	XVI A 4	North-west of village Kariwatari	29.04.1997	Small shelter having 9 cup marks and some faded figures of bird symbols/geometrical designs
63	-do-	XVI A 5	Adjacent to RS XVI A 4	29.04.1997	Contains very large figures of trees and plants, also Brahmi and Persian inscriptions
64	-do-	XVI A 6	A 5 storey complex consisting of 25 shelters/caves on the hill feature north-east of RS XVI A.5	29.04.1997	Only some intricate designs geometrical signs visible
65	-do-	XVI.A 6(a)	Adjacent (almost touching) to XVI A 6	29.04.1997	-do-
66	-do-	XVI A.7	Another hill feature north of XVI.A 6	29.04.1997	A major rock shelter having polychrome paintings. Figures include humans, animals, plants, symbols, handprints, dots, Matridevi etc
67	-do-	XVI A 8	Next hill feature south-west of XVI A 7	29.04.1997	Small rock shelter having a few faded figures
68	-do-	XVI A 9	Same hill feature north east of RS XVI A 8.	29.04.1997	Contains a large number of zigzag/wavy lines, wizard, animals, etc
69	-do-	XVI A 10	North-west of RS XVI-A 7 on another hill feature east of the forest track	31.05.1997	Contains intricate, geometric designs, symbols, human and animal figures and Brahmi inscription of 7th-8th century AD
70	**Geog. Area XVI, Gidherwar-Gambhira Hill Ranges Complex (Distt. Jamui, Bihar).**	XVI A 10(a)	300 m north-east of XVI A 10 on the same ridge	31.05.1997	Some faded geometrical/intricate designs
71	-do-	XVI A 11	1.5 km south-east of the forest track turning and approx 2.5 km north-west of RS XVI A 10	28.05.1997	Small but very important rock-shelter having 137 cupules, 87 engraved lines, human and animal figures, geometrical designs and also engraved figure of fish and Brahmi inscription of 2nd century A.D
72	-do-	XVI A 12	Adjacent to XVI A 11	28.05.1997	Contains figures of a vulture, several dots and Shankha lipi inscription of 4th-5th century A.D
73	-do-	XVI A 13	150 m north of XVI A 11 across a nallah	28.05.1997	A huge shelter containig some very faded figures
74	-do-	XVI A 14	North-east of RS XVI-A 9 across the forest track	28.05.1997	Contains a faded circle with a dot in the centre

75	-do-	XVI B 1	Forest, approx 700 m north-west of Village Jathar across *Kiul* river	03 05 1997	Small shelter containing a wizard with horn, huge *chakra*, geometrical designs, symbol and 4 cup marks, including a huge one
76	**Geog. Area XVII, Gaighat Complex (Distt. Nawada, Bihar).**	XVII A 2	North-west of tribal village Gaighat	19 05 1997	Huge cave containing several faded paintings which include intricate designs, dance scene and inscriptions Tools, bone pieces, potsherd found in and around the cave
77	**Geog. Area XVII, Gaighat Complex (Distt. Nawada Bihar).**	XVII A 3	Approx 15 m north-west of RS XVII A 2		Huge cave but contains only a few faded figures
78	-do-	XVII A 4	South-west of RS XVII A 3	19 05 1997	Huge shelter but contains only a few badly faded figures
79	-do-	XIV A 5	South-East of RS XVII-A 2 across the nallah and north-west of village Gaighat	19 05 1997	Small but very important shelter Contains intricate designs, symbols, dance scene and Brahmi inscriptions from 4th to 7th century AD Charcoal, potsherds and bone pieces found from inside the floor and tools from the nearby nallah
80	-do-	XVII A 6	Adjacent to RS XVII-A 5 (almost touching it)	19 05 1997	A few faded figures
81	-do-	XVII B 1	Approx 1 km north of RS XVII A 5 deep inside the forest	19 05 1997	The biggest cave with multi-storey shelter Has stick figures of four men with upraised hands Mesolithic tools from inside floor found
82	-do-	XVII A 1	West of the forest track and approx 1 km south-west of XVII A 1	19 05 1997	Contains some white colour paintings Documentation yet to be done
83	**Geog. Area XXV, Sarkanda Complex (Distt. Nawada, Bihar)**	XXV A 1	Near a perennial water point in the forest, east of village Sarkanda	26 05 1997	Huge but shallow shelter most of the paintings badly faded only some intricate design visible
84	**Geog. Area XXV, Sarkanda Complex (Distt. Nawada, Bihar)**	XXV A 2	North-east of XXV A 1 on a hill top	26 05 1997	Very long but shallow shelter containing large number of paintings inscriptions and also a blue colour painting
85	**Geog. Area I, Bardauni Complex (Distt. Giridih Jharkhand).**	I A 8	Spur of Daldiya Pahari, approx 1 km from the tribal village Bardauni	Dec 1994	Most beautiful and very important cave It has hundreds of paintings from prehistoric to recent period which includes intricate/ geometrical designs symbols, figures of humans animals, birds

					reptiles, besides Brahmi inscriptions. Upper Palaeolithic and Mesolithic tools,bone pieces, char coal and potsherds found from inside the cave
86	-do-	I B 2	Across Surenallah approx 2 km south-west of RS I A.8 on the spur of Bhadesar Peak	06.06.1996	Contains paintings of Kushan period and Shankh lipi inscriptions

Subject Matter of the Paintings/Engravings

One of the unique feature of the rock art of this region is the predominance of intricate/geometric designs and symbols. These symbols include variations/combinations of circles, squares, rectangles, wheel (chakra), cross, etc. The geometric designs comprise of grids, zigzags, dots, chevrons, curves, nested curves, triangles and rectangles. The intricate designs include rhombic meanders, concentric circles, spirals and their variants covering large space (RS-XI.B.1, XI. A.1, II. A.1, II. C. 2, II. A. 2, II.D.2, XXV. A.2, XI.C.1, XXV. A.1, XVI. A.5, XVI. A.6, XVI. A.7, VIII. A.1, IX. A.1, X. B.1, XVII. A 5, II.C.5, III. A 2, I.A. 8, XVI. B.1, XVII. A.5, etc.).

Human figures are next in order. They have been depicted as hunting, dancing and standing behind animals in victorious postures. The anthropomorphs are normally shown with upraised arms, wide spread legs and very big phalluses (I.A. 8, II. A. 3, IX A.1, etc.).

Third in sequence are animals, birds, plants, and insects.

Reptiles find an important place in the rock art of this region. These mainly include lizards and snakes. (RS-I.A 8, IV.A.1, X. B.1, II. D.2, X-A.1, XVII A.5, etc.).

Plants and trees also find important place in the rock art of this region. Birds shown in the paintings include peacock, eagle, vulture, bat and an unidentified bird with very large body and long neck (I A.8, I.B.2, XVI A. 12, XI. A.1, IV A 2, etc).

Depiction of insects is rare in rock art (Neumayer, E. 1994-95). However, we find depiction of some insects quite prominently such as beetle, centipede, bees, etc., in some of the painted rock shelters of this region (IV. A.1, I A.8, etc.).

Out of the animals, reptiles and birds mentioned above, bison and elephant have already become extinct in this region. Tigers and leopards, found in abundance about 30 years back, have now become rare, though their presence in very small numbers is still felt in the foothills. However, due to the reduction in the tiger/ leopard population, the number of wild boar and bear has increased substantially. Snakes and scorpions are still found in abundance. Number of antelope, deer, hare/rabbits and edible birds has been reduced drastically. Vultures, eagle, hawk and crow, so common in this area, are only occasionally seen now.

Handprints, both negative and positive, found in other rock-art sites are also found in the painted rock shelters of this region (VIA.1, XVI.A.7).

Cup marks of different sizes and shapes are also found in several painted rock shelters (RS XVI. A.11, XVI. B.1, VI. A.2, VI. A.1, XVI. A.4, etc.)

Last, but not the least, the rock inscriptions in Brahmi, Kharoshti, Kharoshti- Brahmi and Shankh scripts form an important subject matter of this region's rock art. The Kharoshti inscription with novel arrangement of the letters and their elongated appearance around a circle found in RS.II.A.2 is a piece of calligraphic art (Mukherji, B.N 1997). The inscription found in several painted rock shelters are paleographically dated from 2nd century B.C. to 9th century A.D. (IV.A.1, III.A 2, II A.2 ,I.A 2, I.B.2, XVII.

A.5, XXV A.2, XVII. A.2, XVI.A. 8, XVI. A.9, XVI.10, etc.). Some of these inscriptions are of great importance having important bearings on the history of India (Mukherjee, B.N. 1997).

Thus, the subject matter of the rock art of this region is very vivid, interesting, unique and rare in many aspects.

Colour Scheme and Technique

This region has paintings almost in all colours used in the rock art. The main mineral colour used is the haematoid red in different shades ranging from orange, vermilion, light red, crimson to brown and purple as also applied in other rock art sites in India. Other mineral colours used are white, black, yellow and green including blue colour. Use of blue colour in one of the rock shelters is a very unique feature of this region's rock art (RS. XXV. A.2).

Superimpositions

Superimpositions are found in most of the painted rock shelters/caves (I A.8, III A.1, III. A.2, VI. A.1, II. A.1,X.B.1, XIII. A. 1, XVI.A.11, XI.A.1, XVI.B.1,XXV.A.1, XXV A.2, etc.). The Mesolithic paintings are superimposed over Upper Palaeolithic, Neolithic on Mesolithic ones and early historical on the Mesolithic or Neolithic paintings. Ancient inscriptions are also superimposed over Mesolithic and Neolithic paintings. Sometimes even inscriptions of late phase of early historical period are superimposed over the inscription of early phase of early historical period. (IV.A.1, III. A.2, etc.).

Encrustation

Many Upper Palaeolithic and Mesolithic paintings are found under thick encrustation (II.A.1, X.B.I, I.A. 8, XVI.A.11, XIII A.1 etc) Even some of the neolithic and early historical paintings are under thin patination (III A.2, IV. A.1, VI. A.1, I. B 2, III A.1, etc).

Physical condition of most of the painted rock shelters/ caves/ open rock surfaces is quite bad though some of the paintings in well protected spots/ hollows are in surprisingly good condition (II. A 2, II. C 2, I.B.2, XVI.A.7, III A 1, etc)

Immediate remedial measures must be taken for preservation/ conservation of this rare national art treasure.

Stylistic and Chronological Classification of the Rock Paintings

On the basis of styles, superimpositions, subject matter and patination the rock art of this region has been classified into the following styles:

Style-1

Paintings possibly of the Upper Palaeolithic period, are represented by style 1 and style 2. Such paintings being the earliest ones are executed mainly in dark red colour found generally under thick encrustation. The human figures are drawn in symbolic form and also sometimes shown mingling with tree roots or reptiles. They appear to be ritualistic figures. Unlike the dynamic and vigorous early paintings of Central India, these figures are mainly static. The head is represented by some sort of lamp shade or in semi-circular form. The figures are drawn in outline or silhouette (II.A.1, II. B.1, X.A.1, II.D.2, etc.). These are found associated with various types of symbols/intricate designs, such as dots, grids, zigzags, chevrons, curves, rectangles, etc. The rock paintings representing purely geometrical patterns are pre-figurative or non-iconic art forms and succeeding figurative or iconic depictions painted either in red or green, animated human and animal figures need to be considered seriously as the earliest depictions belonging to the Upper Palaeolithic period (Sonawane, 1997).

Petroglyhps having very smooth and shining surfaces found in painted rock shelters/caves have also been put in style-1 (RS XVI A 11, VI. A 2).

Style 2

Figures of Style 2 are imposed over the figures of Style 1 or they are superimposed by figures of same style or the style following these. This style differs from style 1 as the figures of this style are comparatively flexible, dynamic and mainly in dancing pose, depicted either individually or in groups of two or three. They are shown in red in full or in thick red lines Besides dancing, some figures are also shown hunting individually or in group of two or three with bows of their own size.

Petroglyphs of RS. XI.B.1, XVI. A.4, VI. A.1 have also been put under Style 2.

Style 3

Style 3 paintings represent perhaps the early phase of the Mesolithic period. In this style the dynamic humans have been depicted as masked dancers and archers.

Style 4

Style 4 paintings represent perhaps the middle phase of the Mesolithic period. It is also the most dynamic phase. Naturalistic outline in depicting animals was retained but body decoration also started. Beautiful geographical designs of ritualistic character were also drawn.

Style 5

Style 5 represents perhaps late phase of the Mesolithic period. Slight stylization in depiction of humans and animals is found. Sometimes these are executed in double outlines.

Style 6

Style 6 represents perhaps the Neolithic period. Depiction of wild animals continued but there is obvious qualitative degeneration. Abstraction increased both in human and animal forms.

Style 7

Style 7 represents, in all probability, the Chalcolithic period. It is very surprising that cattle and other domesticated animals have hardly been depicted in the rock paintings of this region discovered so far. However there is a panel of engravings on a huge granite boulder which contains engraved figures of humped bulls very prominently in the Rajabar Protected Forest.

Style 8

Style 8 represents the rock paintings of the Mauryan period (300 BC to 100 A.D.). Depiction of stylized human and animal figures continued but animals have generally been drawn in naturalistic way.

Style 9

Style-9 represents the Kushan period (100 century AD to 300 AD). Horse riders/ warriors/ other persons in Scythian dress, are depicted in dark red or white outline or wash.

Style 10

Style 10 represents the painting of the Gupta and Post-Gupta period (300AD to 700 AD). Beautiful realistic figures of horses, dogs, small wild animals (rabbits, monkey, etc.) birds, various types of circles/ chakras, trees, flowers, etc. have been depicted on the walls/ceilings of the rock shelters/caves.

Style 11

Style 11 represents the Medieval period (800 AD to 1300 AD). Drawn in red or white outlines, it includes decorated geometrical designs, triangular humans and animals, etc. (RS. III. A.1).

Style 12

Style 12 represents a few paintings of the recent period (1300 AD to the Present). It appears that the painted rock shelters/ caves were completely abandoned after the 13th century AD for the purpose of performing rituals and other artistic activities but continued to be inhabited temporarily till recently.

Tentative Chronological Classification Of The Rock Art

No direct method of absolute dating has yet been applied in the rock art of this region. Hence, indirect methods of dating, earlier used by V.S.Wakankar, Erwin Neumayer, S.K. Pandey, Giriraj Kumar and other Indian scholars, have been adopted for chronological classification of this region's rock art. On the basis of superimposition, styles, subject matter, patination/ incrustation, colours of the paintings and the archaeological evidences the rock art of this region has been tentatively classified chronologically in the following four stages-

1. This stage of hunting wild animals and colleting forest products as means of livelihood has further

been sub divided as under-

(a) Upper Palaeolithic period (25000 to 12000 years B.P.) having two phases- early and late phases represented by styles 1 and 2 respectively.

(b) Mesolithic Period (12000 to 6000 years B.P.) having three phases early, middle and late phases represented by style 3, 4 and 5 respectively.

2. Neolithic or Transitional period from Hunting-Gathering stage to the stage of settled agriculture and domestication of animals (6000 to 5000 years B.P.) represented by style 6.

3. Chalcolithic or the stage of settled agriculture and domesticated animals (5000 BP to 2500 yrs B.P.) represented by style 7.

4. Historical Period (2500 years BP to Present) with three phases early, middle and recent as under -

(a) Early historical period (2300 years BP to 1500 years BP) represented by styles 8, 9 and 10, which may further be sub-divided as under:

(i) Mauryan (2300 yrs. BP to 1900 years BP), represented by style 8.

(ii) Kushan (1900 years BP to 1700 years BP), represented by style 9.

(iii) Gupta and post Gupta period (1700 years BP to 1200 years BP), represented by style 10.

(b) Medieval period (1200 years BP to 700 years BP), represented by style 11.

(c) Recent (700 years BP to present), represented by style 12.

Archaeological Evidence from the Painted Rock Shelters/Caves

A large number of Palaeolithic, Mesolithic and Neolithic tools, potsherds, charcoal and bone pieces have been found in and around the painted rock shelters/ caves. The Stone Age tools have also been found in the surrounding areas especially in and around the perennial streams and open uplands. Used lumps of *geru* or ochre have been recovered along with haematite pencils from inside the painted rock shelters/caves along with microliths (RS.I.A.8, II.A.2., etc.). Richness of this region in stone age tools is evident from the fact that 13 stone tool factories have been found in the area forming part of Nawada, Jamui and Giridih districts.

Megaliths

The rock art region also has some megalithic sites at Dania Forest (Nawada district) near painted rock shelter V.A.1, Dand Mahadev (Sokhodewara forest, district Nawada) and near Garhi Dam (Jamui district).

Buddhist Antiquities

Three painted rock shelters/caves in Jogia complex (south of the ancient city of Dewangarh in Nawada district) were used by the Buddhists as monasteries (RS. VI. A 1, VI. B.1, and VI. A.2). Some fragmented clay tablets depicting Buddha have been recovered from RS. VI. A. 1. Three of them contain *Beej mantra* in Brahmi scripts. A terracotta seal and some clay seals have also been found which contain inscriptions in Brahmi and Kharoshti-Brahmi datable to 2nd to 10th century AD (deciphered by Prof. B.N. Mukherjee). Obviously during the historical period these natural caves/shelters were in use continuously at least from 2nd century AD to the10th century AD and possibly a little later.

Comparison with the Rock Art of other Regions

The rock art of this region has many common features in terms of the subject matter, style, colour, motivation and state of preservation with the rock art of other regions of India as well as abroad. However, due to geographical, climatic and other factors it has some special features and an identity of its own

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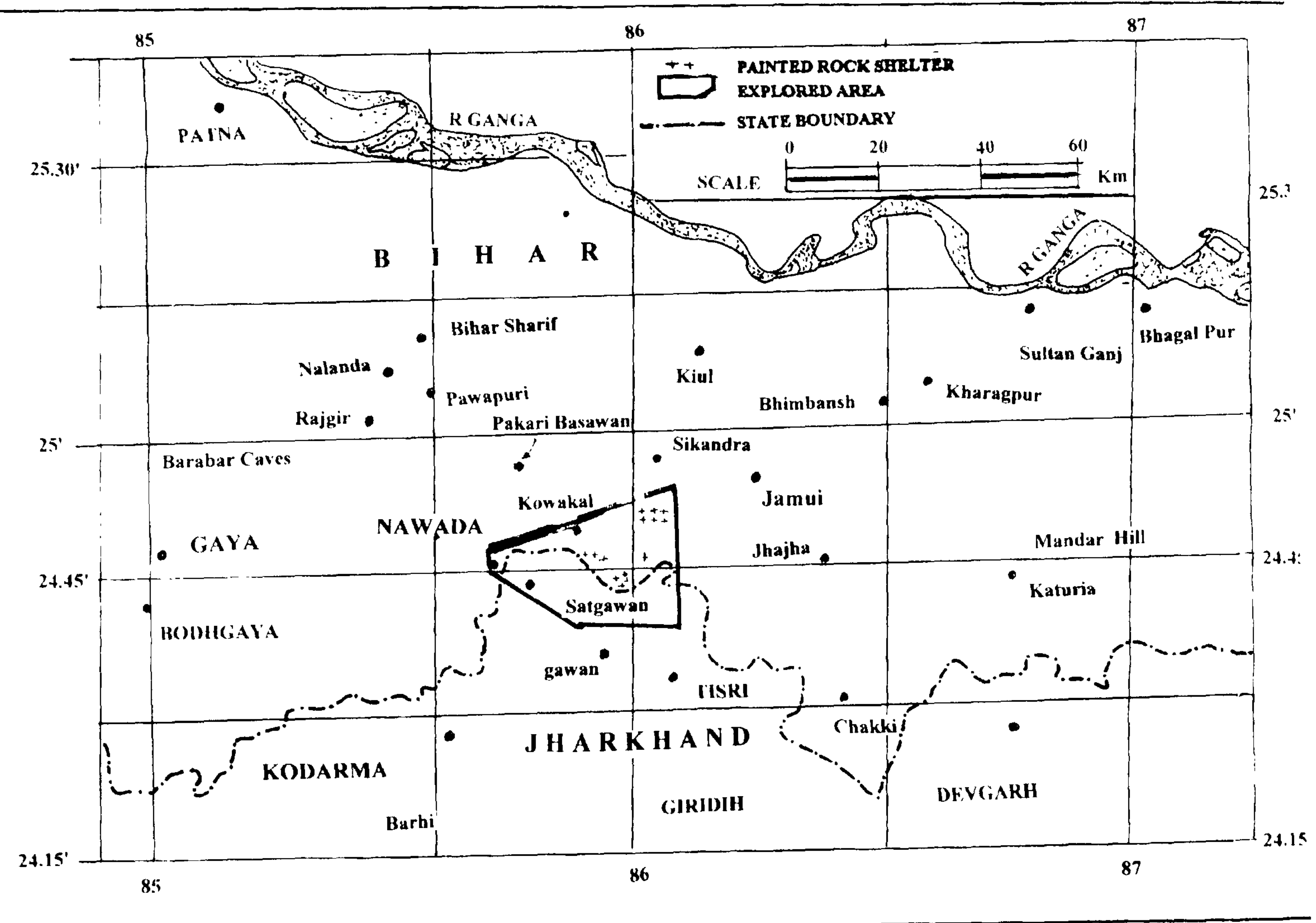


Fig. 1 Location Map of the Discovered Site

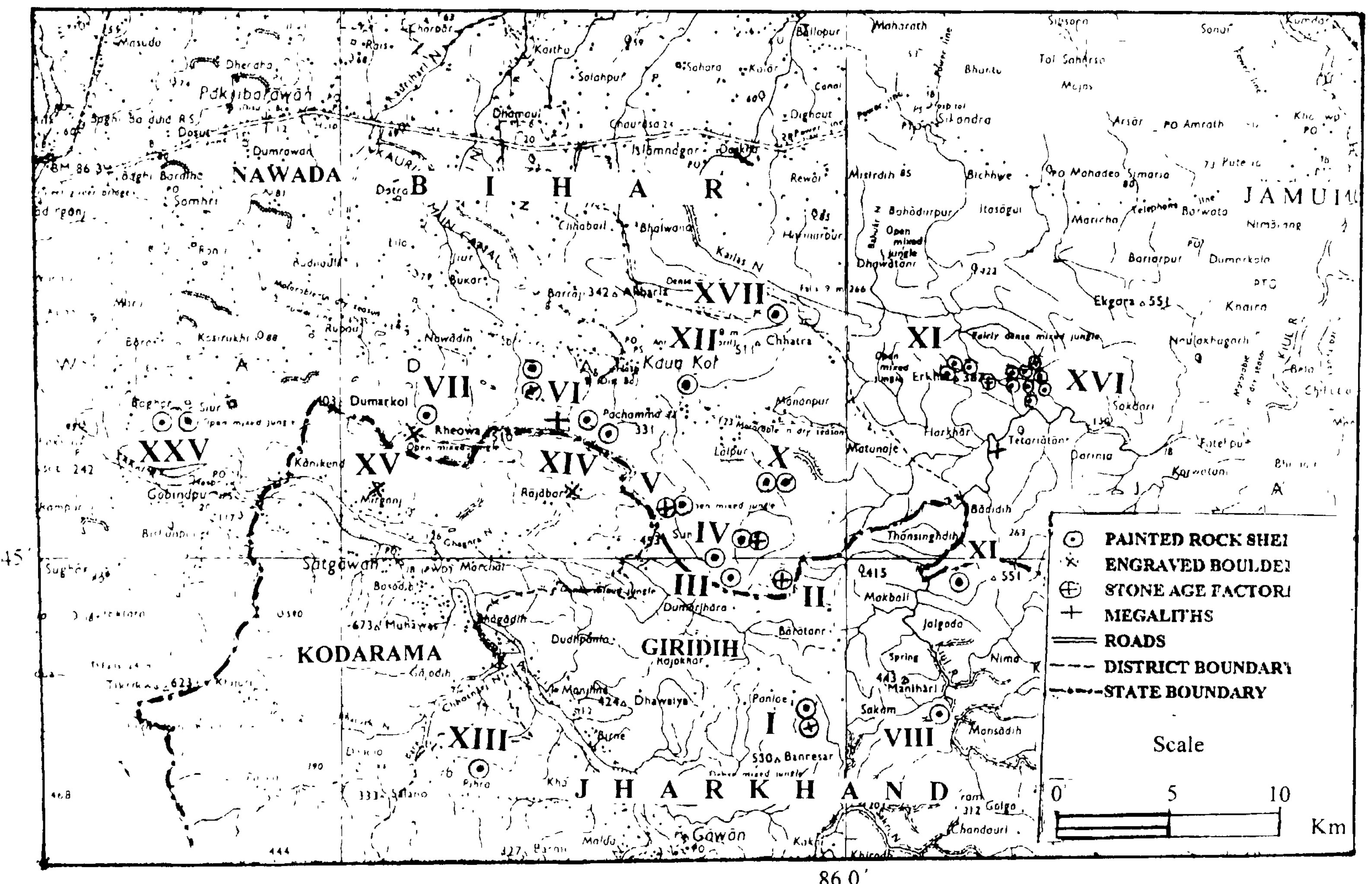
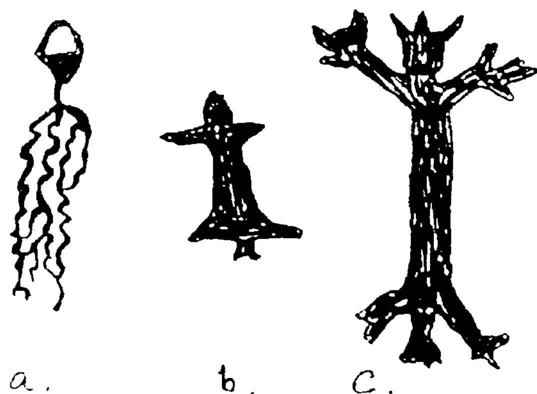


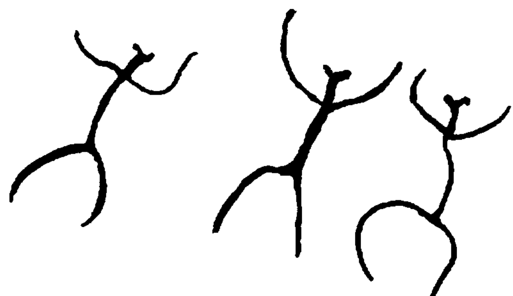
Fig 2 Painted Rock Shelters, Engraved Boulders, Palaeolithic Tool Factories and Megalithic Sites in the Districts of Nawada & Jamui in Bihar and Giridih & Kodarma in Jharkhand



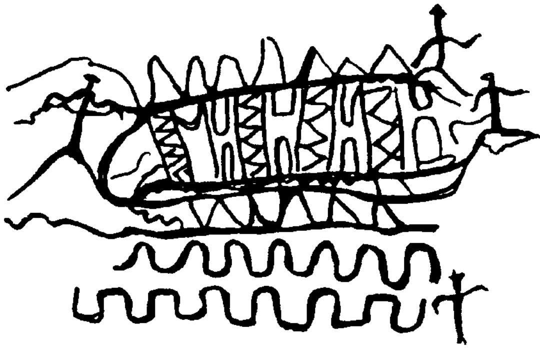
RS.II.D.2. Karmatanr. -a rudimentary human figure. b human figure c anthropomorph. Upper Palaeolithic



RS.II. D.2. Karmatanr. Wavy lines. faint brownish. red executed on large virgin rock surface (41 cm X 24 cm). Upper Palaeolithic



5. **RS.X.B.1.** Sirlohi Dancers in brown heavy outline. Upper Pala olithic



RS.II.A.1. Jharnwa. Dancers on sides of the panel of intricate designs within, heavy red outline (30 cm X 18 cm); under thick patination, early Mesolithic



RS.V.B.1., Dania, a hunter shooting at small animal followed by a bison (50 cm X 13 cm); Early Mesolithic



RS.X.B.1., Sirlohi, the dance around a hunted swamp deer (32 cm X 30 cm) Middle Mesolithic.



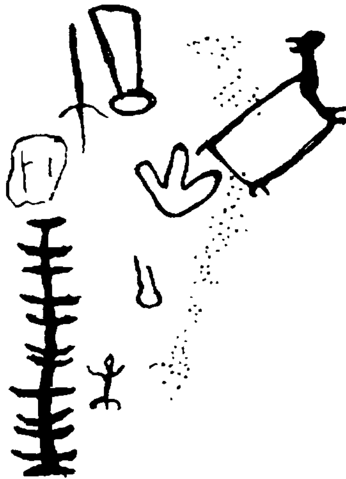
RS.II.C.2. Jharanwa, hunters and dancers around symbols Ritualitic in nature, the figure, are drawn in thick ochre red outline Middle Mesolithic



RS.XI.B.1. Devasthan ridge. A man standing on an animal holding a string tied to the head of the animal (22 cm X 14 cm) Late Mesolithic



RS.XI.A.1. Devasthan Hills, Group of dancers in single file Late Mesolithic



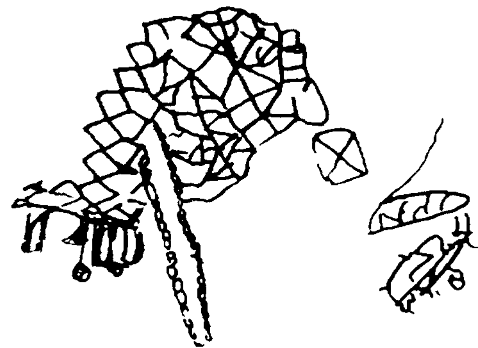
RS.XVI.A.7., Devasthan Hills. An antelope with clumsy small legs, a reptile, cattle's hoof, a small human figure and large no of dots. Brownish red and white colours. Neolithic / Chalcolithic



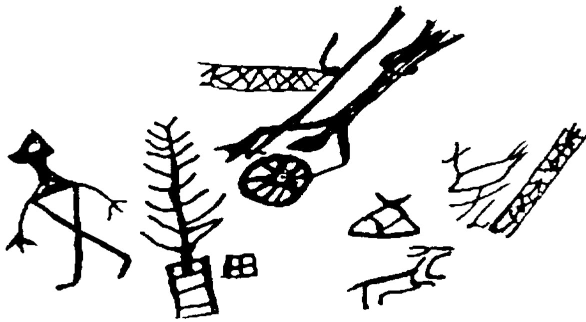
RS.XVII.A.5. Gaighat, a triumphant human figure in front of a trapped deer. Neolithic / Chalcolithic



RS.II.C.5., Jharanwa, Animals, humans and fish around symbols. Neolithic



RS.XVII.A.2., Gaighat, trapping of animals with net. Chalcolithic



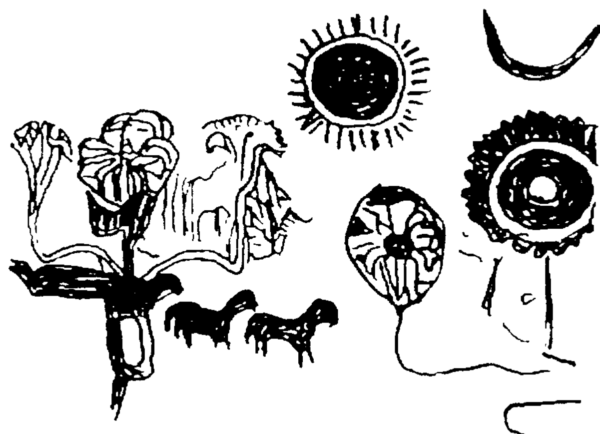
RS. I.A.8., Bardauni, animals, plant and humans around the Mauryan symbol- moon-on-the hill, Early historic



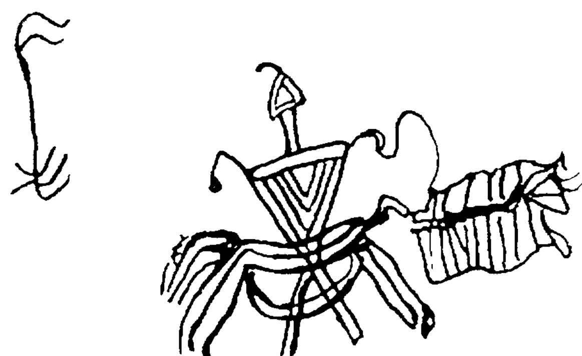
RS.I.B.2., Surenalia, Bardauni, a horse rider, two men and a peacock drawn in brick red double / single outline. Men with triangular head and body while horse in rectangular one. Figures accomplished by Shankh lipi inscriptions, Kushan Period



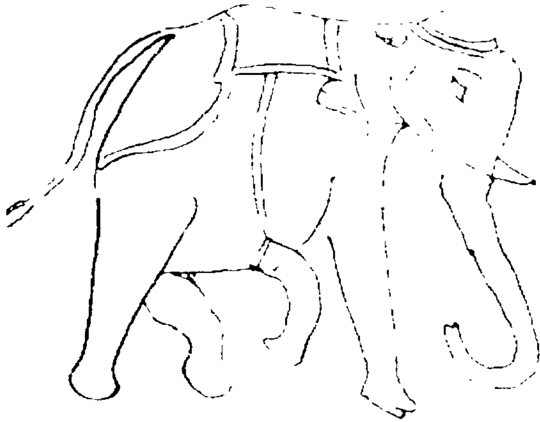
RS.III.A.1., Ranigadar, triangular humans and the horse with rectangular body decorated with geometrical lines in yellowish red, double outlines (23 cm X 22 cm), Kushan Period



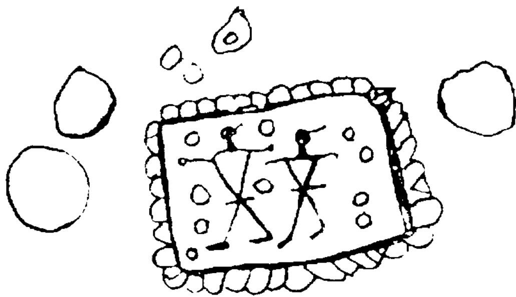
RS.VI.A.1., Jogia Hill, figures of horses, plants and sun in red wash Gupta Period



RS.III.A.1., Ranigadar PI a human figure in ochre outlines the head drawn with two triangles while the body with four triangles having common top base lines (26 cm X 40 cm)



RS.II. XV.A.3., Dudhpanighat, decorated elephant figure engraved on a granite boulder. Medieval period



RS.III.A.1., Ranigadar P.F., two triangular human figures inside a decorated border. Medieval period



RS.I.A.8., Bardauni P.F. figures of a peacock, duck, boy and a charka realistically drawn in ochre colours. Recent period



Various symbols and intricate geometric designs depicted in rock shelters

Iron Objects from Hathab

R. N. Kumaran, Manoj Kumar Dwivedi & Vilas D. Jadhav*

From a very early period, India was famous for a high quality of iron and steel. Smelting and extracting of iron in high quality and quantity was more or less prevalent all over India, although each region had its own indigenous method.

Archaeological Evidence

The earliest evidence of iron smelting in India has been traced from the so-called Chalcolithic period from Eastern and Central India, Rajasthan, etc., where the ^{14}C dating of the Chalcolithic sites gave the readings of 1045±55 B.C. and 920±50 B.C. The other sites which yielded iron furnaces belong to the P.G.W. level and the Megalithic culture of south India and the Deccan.

Iron Objects from Hathab (ancient Astakapara)

Hathab (21° 35′ N, 72° 15′ E) is situated on a rivulet of Maleshwari river which flows from the NW to NE, encircles the mound forming a moat before draining into Gulf of Cambay, 1.5 km away. Excavations here revealed the existence of an early historic city protected by a mud fort. The dig also brought to light several iron and copper tools, weapons, utensils, ornaments, hoards of coins, gold and silver jewellery, hundreds of terracotta sealings, terracotta human and animal figurines, figurines of mother goddess, beads of various semi-precious stones, besides shell industry.

The Objects

Although majority of them were fragmentary and corroded, most of the iron objects were of recognizable shapes. The objects described hereafter form only a small percentage of the total iron antiquities found at Hathab. The material culture of Hathab excavation falls into three periods: Mauryan, Kshatrapa and the Maitraka. The earliest period did not yield iron. Most of the iron objects came from the second and third periods.

The iron objects fall into various categories, viz. nails forming the majority, chisel, knife, sickle, axe, arrowhead, chopper, objects of decoration, miscellaneous objects. Each can be divided into sub-types as described below:

1. Nails

Type-A

(i) Nails with medium rounded boss head, tapering sides; length 6.3 cm

(ii) Nails with heavy circular head and square section, tapering sides, length 5.4 cm.

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(iii) Flattened rectangular head, with square section tapering gradually downwards; length 9.1 cm.

Type-B

(i) Nails with broad, flat, angular head, tapering gently towards the point; length 11 cm.
(ii) Nails with angular head, but heavy, tapering gently towards the point; length 10.2 cm.
(iii) Nails with angular head, but tiny, tapering gently towards the point; length 3 cm.

Type-C

(i) Wedge shaped headless nail with square section gradually tapering to the point, length 5.8 cm.
(ii) Headless nails, but diamond shaped, gradually tapering towards the point; length 6.4 cm
(iii) Square head with same section, gently tapering towards the point, length 5.5 cm.
(iv) Circular head with same section, gently tapering towards the point; length 8.3 cm

2. Chisels

Chisels from Hathab were found in good numbers and varieties. Such as the earliest one are : (a) bare metal, square bar, rectangular section, tapering sides with concave point, (b) a small rough square section bulging in the middle and with double sloping edge, (c) a bar metal with square section headless chisel tapering from top downwards to a splayed crescentic edge like the one found at Taxila; and the others were, (d) bare metal, round bar tools for stone-cutting, (e) square headless chisel with same section with extended circular point; and the last (f) square bar tool bulging near the neck and with splayed single slope cutting edge intended for mortising work

Type-A

(i) Bare metal, rectangular bar chisel with tapering sides with medium cutting edge, length 12.1 cm

Type-B

(i) Small chisel with rough square section, bulges in the middle and with double sloping edge, length 7cm
(ii) Small chisel, with wedge shaped top and the lower one tapering towards the point; length 5.1 cm.

Type-C

Bare metal, with rough rectangular section, headless chisel, tapering gradually from top with slightly splayed, single crescentic cutting edge; length 7.7 cm

Type- D

Round bar chisel with slopping sides and pointed edge, meant particularly for stone cutting; length 9.7 cm.

Type-E

Headless, circular top with square sectioned chisel, tapers gradually towards the extended circular point, length 6.8 cm.

Type-F

Bar metal chisel, approximately square in section, bulging near the neck with single slope and slightly splayed crescentic cutting edge; length 22.7 cm

3. Knives

Most of the iron knives from Hathab were damaged and broken, but a few fine specimens revealed, as at Taxila, straight backed, straight edged type with tang for fixing into the handle (Plate 3)

(i) Straight backed, straight edged knife, damaged, length 13.4 cm
(ii) Straight, single edge knife with tang for handle, length 13 cm

4. Sickles

Very few sickles (Plate 4) were encountered from Hathab, which belong to the period of the Kshatrapas, although they must have been used in the early periods also. The only type found here was sickle with curved blade, inner edge and tang are broken, but with handle; length 16.5 cm.

Axe

A lone axe, of the socketed variety with a wide drooping blade, giving the axe a medium crescentic edge (plate 3), belonged to the period of Kshatrapas.

Arrowheads

Arrow heads found here were with hollow sockets, indicating that they were intended for shafts made of reeds. At Hathab, this is the only variety found, with lozenge cross-section having flat body, although the shape of the body is different.

(i) Leaf shaped, with lozenge cross-section, double tang with handle; length 10 cm
(ii) Pipal leaf shaped, with lozenge cross-section, double tang with handle; length 5.5 cm.

Chopper

A simple fine specimen of chopper (plate 5) with heavy, flat, slight concave body, a medium-size handle, the outer side of which is thick, the working edge is thin and nearly 30 cm in length.

Decorative Objects

Besides the above, some decorative objects were also encountered in the excavations.

(i) Bangles, thin circular piece, damaged.
(ii) Ear-ring, semi-circular piece, damaged.
(iii) Bracelet, semi-circular piece, damaged.
(iv) Anklet, circular piece, damaged.
(v) Pendant, thin section with straight tapering sides, top is finished by angular touch with the hole; length 4.3 cm.
(vi) Ring, flat circular tapers towards the end of circle.
(vii) Hooks
(viii) Door-objects, *Pipal* leaf in shape and with a small socket at the end for hanging; length 19.2 cm.

Miscellaneous / Unidentified objects

Apart from these, some unidentifiable objects were encountered

(i) Laddle (?), small piece, badly damaged.
(ii) Needle, square section, top is flat with pointed bottom; length 5 cm.
(iii) Miniature bowl, out-turned rim, concave interior.
(iv) Rod, round headless, hexagonal section with straight sides, damaged; length 7.5 cm.
(v) Vessel, rim portion, damaged.
(vi) Miniature Hoe (?), Pipal leaf in shape but the bottom is elongated.
(vii) 'E' (?), like English alphabet.
(viii) Chandra (?), medium circular rod topped by moon, copper plated.
(ix) 'L' (?), flat 'L'-shaped object.

Discussion

The Iron objects in such profusion clearly indicated that Hathab was a warehouse to collect the iron objects from the interior and later exporting them to the Western countries. It is clear from the *Periplus* that in the 1st cent. A.D. Indian iron and steel were being exported from Ariaca (Gulf of Cambay) to Abyssinia. It seems that Hathab, situated only 1.5 km from the Gulf, was a port then and iron played an important part in its trade and economy. The ancient is Astakapra, a mine site, where during the course of exploration and scientific excavation, large quantities of slags in various shapes, some embedded with wood and charcoal were discovered. At Khadsliya, 3 km away from Hathab, has brought to light various shapes of slags at various stages of working. It seems to be a mining area from where slags were extracted for smelting and then making tools and implements.

Another interesting feature was an iron furnace exposed during the course of excavation, which runs from EW to NS, to nearly 4 m in length, where huge amounts of charcoal, raw materials and some finished nails were encountered. This clearly shows that the tools and implements were produced here itself.

The stratigraphical study clearly shows that during the Kshatrapa period iron objects were found more in number than during the other periods. There is evidence that the Roman Emperor, Marcus Aurelius (A.D. 121 - 180) and his son Commodus included *ferrum indicum* (Indian Iron) as one of the dutiable articles, imported from India. Again, this shows that Hathab, during the

Kshatrapa period, was one of the Roman trading stations on the west coast. Terracotta sealings, more than 300 in number, were found in one pocket near a ware-house with names of individuals, which clearly shows that there occured brisk trade activities.

As far as iron nails are concerned, most of them were without any marks of having been used and are like just finished ones. A study shows that they were meant for export. During the Kshatrapa period, the types were more or less the same, but during the later period, they not only varied in sizes but also varied in shapes. It is worth mentioning here that most of the decorative and miscellaneous/unidentified objects also belonged to the later periods, i.e., Maitrakas, which clearly shows that to some extent after the fall of Kshatrapas, the Maitrakas continued the brisk trade with the Roman countries.

Table -1: Detailed table of important Iron objects and their provinence at the site of Hathab, Dist. Bhavnagar, Gujarat

S. No.	Objects	Locus	Trench	Layer	Depth (cm)	Dimension (length in cm)	Description
1	Nail	HTB	AJ-21-1	8	-245	6.3	Medium Round base head, circular section tapering sides
2	"	"	AH-21-1	8	-177	5.4	Heavy circular head, sq. section
3	"	"	AJ-21-1	14	-450	9.1	Flat, rect. Head, sq. section, tapers gradually to point.
4	"	"	AK-55-1	1 s b 1	-128to130	11.0	Flat, angular head, tapers towards the point
5	"	"	AH-22-2	3	-114	10.2	Flat angular head but heavy
6	"	"	AJ-55-3	2	-107	3.0	Flat angular head but tiny
7	"	"	AL-21-2	3	-107	5.8	Wedge shaped, headless nail, sq. section
8	"	"	AK-21-2	1 s b 1	-45	6.4	Diamond shaped
9	"	"	AH-22-1	2	-62	5.5	Square headless & square section
10	"	"	AJ-21-1	9	-260	4.1	Circular headless with circular section
11	"	"	AL-21-4	1	-35	4.6	Circular head triangular section
12	"	"	AJ-55-2	3	-88	6.8	Square head triangular section
13	"	"	AJ-21-1	8	-24	6.3	Circular head & circular section
14	"		AJ-21-1	2	-57	5.3	Circular head with hexagonal section
15	"		AH-21-1	8	-177	5.4	Circular head with square section
16	Chisel	"	AJ-21-1	11	-330	12.1	Rectangular bar chisel with tapering sides
17	"	"	AH-21-4	6	-188	7.0	Small chisel, rough sq. section, bilges in middle with double sloppy edge

18	"	"	AJ-21-1	7	-208	5.1	Chisel, but with double working edge, top with wedge shape, lower one tapers to point
19	"	"	AK-21-2	1 s.b. 1	-32	7.7	Small chisel, but rough rectangular section with slightly splayed single crescent cutting edge
20	"	"	AK-22-2	2	-60	9.7	Round bar chisel, sloppy sides with pointed end
21	"	"	AL-21-4	2	-58	6.8	Headless, circular top, sq. section, tapers gradually to extend circular point
22	"	"	AK-21-2	1	-34	22.7	Base metal, sq. in section, bugles near the neck with single slope with crescent edge
23	Knife	"	AJ-21-1	7	-	13.0	Straight backed, straight edge
24	"	"	AJ-32-2	2	-50to55	13.0	Straight single edge knife with tang for handle
25	Sickle	HTB	AJ-55-2	1 s.b. 1	-	16.5	Curved blade, inner edge and tang are broken but with handle
26	Axe	"	AJ-21-1	7	-208	8.7	Socketed with a wide splay blade having medium crescent edge
27	Arrowhead	"	H-46-2	3	-65to-75	10.0	Leaf shaped, lozenge cross-section, double tang with handle.
28	"	"	AK-22-4	-	-360	5.5	Pipal leaf shaped
29	Chopper	"	J-46-2	3	-94	30.0	Heavy, flat slight concave body with medium size handle

Table-2: Detailed table of important decorative and miscellaneous objects found at Hathab, Dist. Bhavnagar, Gujarat

R.No.	Object	Locus	Trench	Layer	Depth (cm)	Dimension (cm)
1	Bangle	HTB	G-43-2	3	-71	-
2	Earing	"	AK-55-4	2	-87	-
3	Bracelet	"	AL-23-1	1	-45	-
4	Anklet	"	H-44-1	2	-40 to -54	-
5	Pendant	"	AJ-32-4	1	-22	-
6	Ring	"	G-42-2	2	-46	-
7	Hook	"				
8	Door object	"	AL-22-1	1	-47	9.2
9	Laddle	"	G-45-4	2	-25 to -31	-

10	Bowl	"	AH-21-2	1	-32	-
11	Needle	"	H-44-2	1	-20	4 8
12	Rod	"	AJ-21-3	1	-28	7 5
13	Vessel	"	AJ-55-1	4	-152	-
14	Hoe ?	"	AI-22-1	1 s b 1	-58	4 0
15	'E' ?	"	AK-22-4	-	-145	4 0
16	Chandra ?	"	K-44-1	6	-150 to 155	8 0
17	'L'	"	G-42-4	2	-54	3 5

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Tank Irrigation System of the Megalithic Builders in South India–A Reassessment

K.N. DIKSHIT*

There is no uniform megalithic culture in the world. it is the megalithic typology used by the megalithic builders in the different parts of the world starting from neolithic times to the late centuries of the early Christian era. In South India, these builders generally belong to Iron age, although claim have also been advanced for their beginning to pre-Iron age. More than one hundred sites with megalithic association have been excavated but only a gew habitation sites have been touched and that too not extensively. In most cases detailed reports are not available. R.K. Mohanty and V. Selvakumar provided a detailed information on the archaeology of the megaliths in India but missed the economic issues (Mohanty and Selvakumar, 2002: 313-352). However, in the present paper an attempt has been made to marshal out the basis of their economy that was primarily pastoralism but also practiced agriculture, based on tank irrigation, a system introduced by the megalithic builders in South India. What kind of crops were produced by them is still inconclusive and under interpretation. Recent systematic investigations in Vidarbha, which were a part of multidisciplinary approach, exposed the remains of archaeobotanical evidence.

Agriculture was practiced by the neolithic communities to a limited extent but scholars also connect megalithic users with the introduction of advanced methods of agriculture on a large scale as is evident by the availability of the agricultural tools found in the excavations. They have also been credited with the construction of bunds at the slopes of the hillocks and high-grounds across the natural gradients where the rain water flowing down was stored. The megalithic settlements were found located in the vicinity of these so-called irrigational tanks built on a rocky high-ground and unproductive foot-hills and other rocky areas which were also used for the graveyards.

Field Data

While going through the regional surveys of megaliths in South India one finds the description of types and other details but their activities in the field of economic growth have not been taken into account as has been done in case of megalithic survey in Vidarbha region. In Kerala, megalithic types were reported by Babington, Logan, Longhurst, Alexander Rea and others but Tamil Nadu is archaeologically the best surveyed region and investigators referred to the bearing of the findings on the authorship and chronology of these burials, including the disposal of the dead and methods adopted in the construction of these graves. The location of burial tombs were noticed near irrigation tanks especially in Chingleput District. The site of Adichanallur

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was put to extensive excavations and is one of the richest sites in revealing the megalithic associated repository, including bronze ware and gold diadems not reported from any other site.

In Karnataka, systematic excavations were undertaken at Brahmagiri and Chandravalli although Meadows Taylor and others undertook large scale exploration. However, in recent years Sundara, Gururaja Rao, and State Department of Archaeology have done commendable work. But in Andhra Pradesh, the former State of Hyderabad under Nizams had received some attention, whereas systematic surveys and excavations were taken up only in recent decades. In all these four States, which form the core area of south India, the investigations carried out in the field of megalithic studies are limited to only certain issues and do not present any satisfactory picture about their contribution in the agro-economic development of the area during the first millennium BC. The megaliths have been placed in south India from the middle of the first millennium BC to 2nd Century AD within which each megalithic type finds its own survival. This internal chronology has been a difficult problem although radiocarbon dates provide a better level of accuracy. The system of tank irrigation is one of the issue of this period as it deals directly with the water resources and thereby with socio-economic perspective of the life of megalithic people. From other parts of India no such irrigation system has been reported connecting the users of megalithic types.

Evidence of Agriculture

Excavations from a number of sites brought out agricultural aspect of the megalithic economy with the evidence of rice, barely, wheat, kodo millet, lentil, grass pea, horse gram, red gram, etc. This is further augmented by the agricultural implements found in the graves. These include spades, flat-axes, often with detachable ring-fasteners, sickles and billhooks, thick round bars used as crowbars and ploughshares.

Tank Irrigation System

1. Srinivasan and Banerjee while dealing with some aspects of the Indian megaliths discussed the influence of geology and climate on the location of burial structures and claimed that 'these monuments have invariably been found to occur on rocky highgrounds, which are themselves unfit for cultivation, in juxtaposition to hillocks and an irrigation-tanks but in very close proximity to arable lands. The hills supplied the material of the structures and, by the nature of the rock, influenced their shape; the irrigation tank intended to hold rain water perennially owing to the lie of the land, made the cultivation of the adjacent arable land possible' (Srinivasan and Banerjee 1953:109). The larger irrigation tanks showed larger concentration of megalithic monuments near them specially in Chingleput District. Banerjee reiterated these statements in his later writings while dealing with the megalithic problem of Chingleput but no photograph of any tank has been given. He puts the users of megalithic types 'as the introducers of the irrigation system in the south by the tank irrigation method, which involved the collection of rain water flowing down from the surrounding catchment area by bounding up the sloping side-- practice which is still in vogue (Banerjee, 1956:23). Gururaja Rao quoted the works of earlier scholars while advancing this very concept but without any photograph. (1972:298-299).

2. While dealing with the life of megalithic builders Narasimhaiah (Narasimhaiah, 1980: 198-203) has credited various scholars who introduced the theory of 'tank-irrigation in South India', thus bringing a revolutionary change in agricultural system. He opined that 'their statement is based on circumstantial evidence' and 'needs re-assessment in the light of further research and field work carried out recently'. To quote 'some of the megaliths which seem to be on the edge of the tanks in the summer season, at Wandivasal and Mamandur in the north-eastern region, are virtually submerged in water during the rainy season'. This observation was made in regard to Sittannavasal in Pudukkottai region also. However, one can argue that the embankment of these tanks might have been raised subsequently The question then arises as to what was the level of ancient embankment, if at all it was man-made? Was the water stored in it sufficient for cultivation? Some of the sites such as Gengaleri, Jainpur, etc., are on the bank of the river Markandeya, District Dharampuri Does this mean that the megalithic people were harnessing the river water also for cultivation? In support of his argument, he mentions some sites which are situated deep inside thick forests in Denkanikota region in District Dharampuri and Chengam Taluk in District North Arcot Neither there is

any land for irrigation nor any tanks nearby in these regions. There are many sites where there are no tanks. But this recent field-work (Narasimhaihaiah, 1980, 203) also confirms the fact that the megalithic builders were not the people who introduced tank irrigation at least in Tamil Nadu. These tanks were possibly the natural ponds meeting the daily household needs but in no case irrigation.

3. Moorti has made a detailed study of this issue (Moorti, 1994 : 19-44). As the opinions vary on the nature of economy of the megalithic communities from agriculture to pastoralism, he quoted Leshnik (1974) Narasimhaiah (1980) and Deo (1985) in favour of pastoral base but McIntosh (1982) has taken a moderate view and suggested 'a gradual shift from seminomadic economy to sedentary economy from early to later Iron age phase.' The classification of subsistence economics into mobile, sedentary and mobile-cum-sedentary has been ascribed by various scholars dealing with the megalithic economy. Moorti has further reviewed and compared the archaeological data in a table showing physiographic distribution of the sites with respect to agro-pastoral economy.

It must be noted that no satisfactory light has been shed on the economic pattern in any of the megalithic surveys. Also, some opposing theories are based solely on the location of burial sites being nowhere near the irrigation tanks. This can be countered with the view that in that era, open space was not a problem and the megalithic dwellers were under no compulsion to build their place of habitation right next to the burial grounds. The burial sites near the banks of rivers merely suggest an easy source of water supply. Although there is mention about pastoralism, absence of complete evidence suggesting any other strong economic activity, apart from agriculture, forces us to conclude that their economy hinged and survived solely on it, and if yes, how was large scale irrigation possible through ponds or river water harnessing in some areas? Until further studies throw new light on the alternate source of living of the megalithic dwellers, we can credit them as the pioneers in tank irrigation system because reversal of subsistence pattern can take place only if there is any climatic change for which no evidence has been quoted by any scholar. The dry climate continued during c.3000 BC-1000 AD (Abhyankar, 1987).

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Excavations at Siswania (District Basti, U.P.) : 1995-1997

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The archaeological mounds at Siswania, (Lat. 26°45′ N; Long.82°46′ E) in Basti district of Uttar Pradesh were explored in 1944 which were identified by me in 1991 with ancient city of Setavya (Mani 1991) and were excavated under my direction for two seasons (IAR-1995-96 and 1996-97). As Superintending Archaeologist of the Excavation Branch II, New Delhi, of the Archaeological Survey of India, archaeological investigations in trans-Ghaghra plains during 1995-96 and 1996-97 were carried out and 126 archaeological sites were new discoveries. Besides regular excavations at Siswania, exploratory soundings at Deoraon, Pipari, Orai, Mundiar and Dharamsinghwa came out in that region. The extension of Siswania mounds from village Deoraon in the north upto villages Tarijot and Pachisa in the south along the left bank of river Kuwano or Kuwana[1], a tributary of Sarayu (Ghaghra) and the proximity of much revered Siva Shrine of Bhadresvaranatha where the river forming a loop flows to some distance towards north (Uttaravahini) and then turns to south-east, definitely indicate great importance of the site. The discovery of a multi-socketed terracotta coin mould and large amount of ancient coins together with variety of terracotta figurines and sherds of Northern Black polished ware (NBPW) made the explorers believe that the site represented a Maurya-Sunga wharf town.

During the course of two seasons of explorations in 1995-96 and 1996-97 in the areas covering Basti and Siddharthnagar districts (Sant Kabir nagar district was carved out later from the two districts), not only nature of the settlements were studied, but a number of mounds with their names or their village names were identified with ancient cities or with townships having corporate guilds *(nagara and nigama)*. Such identification (Mani 1997) of modern names of places with *nagaras* and *nigamas*, like Siswania with Setavya, Ukada with Ukkatthā, Ama with Atuma, Nagara with Nagaraka, Mehdawal with Medatalumpa, Saltauwa (alongwith Sevaidih) with Sālavatikā or Sālāvatī and Behil with Vehalinga – all going back to the time of Buddha as also proved from the antiquarian remains found from these sites, have significantly given the idea to make progress in further identification of sites mentioned in Pali literature.

The famous *Pāyāsisutta* of the *Dīghanikāya* (Rhys Davids 1911:349-79) mentions about the discourse by Kumāra Kassapa to Pāyāsi Rājanya on the rebirth and karma in the Simsapavana to the north of Setavyā nagara in Kosala kingdom; the name of Simsapavana or the grove of Simsapa or Sisam tree *(Dalbergia Sisu)* is still preserved in the name of the place Siswania, 9 km

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[1] Smt Durgavati Tripathi, my grandmother believed that the river Kuwano is the ancient Sundarika mentioned in Pali literature on whose banks was the hermitage of *Sundarika* Bharadvaja in the time of Buddha

towards south-east of Basti city on the left bank of Kuwano. Three mounds in a series are found along the river in north-south orientation in an area of approximately 1000 x 300 m, and have been designated as SWN-1, SWN-2 amd SWN-3. Towards north and north-west are situated villages of Bankata and Deoraon with habitational deposits and remains of early historical period. Names of the two villages suggest that towards the north of the main habitational centre of the city, forest was cut in the past and probably to its north-west was the significant place of discourse mentioned in the *Pāyasisutta* where some Buddhist monastic establishments came up possibly later during the Kushan period which was called Devārāma or Devaputrārāma (the monastery constructed by Devaputra, i.e. Kushan king), as suggested by the present name of the village as Deoraon.

Setavya is also mentioned in the *Vatthugāthā* of the *Pārayāṇavagga* of *Sutta-Nipāta* (Chalmers 1932:106-44) in the context of Bāvari's story who despatched a group of scholars, to get answers to some metaphysical questions from Buddha, who travelled to Sāvatthi (Sravasti) and then to Setavyā, Kapilavatthu (Kapilavastu), Kusinārā (Kusinagara), Pāvā and Vesāli (Vaisali).

Cuttings and Chronology

As already said the entire site of Siswania was divided into three areas SWN-1, SWN-2 and SWN-3 as per the existence of three mounds separated by water-channels along the River Kuwano in north-south orientation (Fig.1). After exploration and contour-survey, trenches measuring 10x10 m were laid and excavations were taken up in 44 quadrants of 29 squares. Mounds at SWN-2 and SWN-3 were found badly damaged due to extensive cultivation and levelling of the area. 5 quadrants of 3 squares in SWN-2 and 3 quadrants of 3 squares in SWN -3 were excavated. The main mound at SWN-1 was found in a better state of preservation then the others, although the top layers have suffered some damage due to the levelling of the ground for cultivation and some building activities in the late medieval period.

The deposits revealed a sequence of four cultural periods (Fig 2)

Period I : pre-NBPW period (*circa* 10th-9th century BCE)
Period II : NBPW period (*circa* 9th-3rd century BCE)
Period III :Sunga period (*circa* 2nd-1st century BCE)
Period IV : Kushan period (*circa* 1st-3rd century CE).

With the construction of a small Ram-Janaki temple at SWN-1 in the late 18th or early 19th century, some late medieval remains are also found at the top of the mound. Sounding at Deoraon also provided evidence of the same cultural sequence and similar material as noticed at Siswania. A wall of brickbats belonging to the late Kushan period was encountered in the sounding.

Period I at Siswania is the same as Period II from Sringaverapura (Lal and Dikshit 1981) having similar ceramic assemblage, although it is represented by a deposit of 1.40 m at Sringaverapura and is only 15 cm thick at Siswania and with no gap it merges with the next deposit represented by the NBPW. Thus Period I at Siswania can be assigned a time span of probably less than 50 years or so and 1.40 m thick deposit of period II in which NBPW makes its appearance can be assigned a time span of about six centuries. I prefer here revising my own dating (IAR 1995-96:83) on the basis of new radiocarbon dates of NBPW deposits from some recent excavations which are more convincing than what has been traditionally believed. Continuation of the same culture from Period I to Period II without any break but only with the introduction of NBPW suggests on one hand a contemporanity with Period II of Sringaverapura and on the other a bit early introduction of NBPW. The ^{14}C and TL dates from Sringaverapura for Period II are 960, 820-840, 819, 793, 740 and 710 BCE and therefore NBPW deposit of Period III has been ascribed to C.700-200 BCE. Thus the entire time span represented by Periods II and III (c.10th century BCE to c.2nd century BCE) at Sringaverapura is represented in Period I and II at Siswania. The ^{14}C dates of 685 + 105 BCE from NBPW level at Noh (IAR 1971-72:86), 730 + 150 BCE and 660 + 100 BCE from NBPW levels at Mathura (Joshi and Sinha 1981) and 640 + 90 BCE from an early NBPW level at Jhusi (Misra *et al.* 2000:28) suggesting its beginning in about 8th century BCE cannot be just ignored.

The four charcoal samples from Siswania sent to the Birbal Sahni Institute of Palaeobotany, Lucknow for radiocarbon dating, have provided inconsistant and out of context dates which perhaps cannot be relied upon. They

are as follows –

1. BS-1350:- BP 4750 ± 130 (Cal. BCE 3616, 3591, 3525)
2. BS-1354:- BP 850± 140 (Cal. CE 1025-1290)
3. BS-1355:- BP 270 ± 160 (Cal. CE 1651)
4. BS-1356:- BP 670 ± 100 (Cal. CE 1300)

The above first sample (BS-1350) is much earlier than the expectations while the rest of the three are absolutely recent. However, a similar earlier date of 2790 BCE (BP 4740+210) from Ganwaria (Srivastava 1996:57) in the same region compared with the present early date may suggest some human activity in the 4th-3rd millennium BCE, so also the new dates from Lahuradewa (Tewari *et al.* 2003:37-68), another recently excavated site near Basti. An early ^{14}C date from NBPW levels at Takiapar (IAR 1973 –74:54) being 2780 ± 125 BCE, is considered as having the sample belonging to much older tree and showing post- sample growth error.

Period I

The pre-NBPW deposits (Fig.3) noticed in a limited area in Sq. YA3, Qd.1, were characterised by the presence of black-slipped ware, a couple of these sherds being white painted, black-and-red ware (plain) and associated red ware (Figs. 4-5). The shapes include bowls, dishes, vases, miniature vases perforated footed bowls and jars having cord impressions on the exterior parts of the body. In some quadrants, NBPW was also present in the earliest level suggesting a small duration of pre-NBPW occupation at the site. It was thus observed that the early settlements of the site were located closer to the river Kuwano on its left bank and with the increase of population during NBPW period, the settlement, spread towards east, particularly during later periods when it occupied a very large area. No structural remains of pre-NBPW period could be located though reed marks on clay lumps suggested structures of *wattle and daub* during the period.

Although in most of the areas of the site, the simple and direct superimposition of deposits allows us to say at least that one set of material came before another, suggesting a techno-typlogical comparison or a general morphological similarity between bodies of material at different sites for relative dating. But to me the stratigraphical context of Period I seems to be significant as it has left localised deposits, sporadically spread at the actual habitational area noticed in small patches over the natural soil which further suggests the short span of occupation before the initiation of NBPW, the characteristic ceramic of the following period in which the entire site was occupied. It is evident at many of the trenches where the NBPW deposits lie just over the natural soil and its long existance is visible in more than one meter thick stratified deposit which is rare in the former case.

Period II

Period II represented by NBPW was rich at the site with a wide range of ceramics including continuation of early shapes of Period I. However, black-slipped ware without any painting, black-and-red ware and associated red ware were also present (Figs. 6-7). Black-and-red ware sherds of vase, dish and deep bowls have been found which were well-fired and have medium fabric. Coarse black-and-red ware sherds have also been found. The black-slipped ware included mainly convex-sided dishes and bowls, besides deep bowls and slightly inturned rim or having mild depression on the exterior part of the rim. They were well-fired and were medium to coarse in fabric. Red ware of both hand-made and wheel-turned varieties were the predominant ceramic types represented by jars with externally flared rim having cord impressions on the exterior part of the body, deep bowls with sharp inturned rim, bowls of medium size with incurved rim, channelled-bowls, perforated-bowls, footed-bowls, vases, convex-sided dishes, miniature lids or stoppers, basins including channelled or lipped-basins, miniature pots, black painted red ware, hopscotches, etc. Vases of Ahichchhatra 10a type were present in the second period alongwith carinated *handi*. NBPW of both monochrome as well as polychrome varieties having silver, golden, black, red and greyish shades have been found comprising mainly the convex-sided dishes and bowls with sharp rim, sometimes having mild depression on the exterior part, ranging from medium to fine fabric, occasionally painted. Grey ware sherds of convex-sided incurved dishes and well-fired convex-sided bowls of medium fabric were found from the levels of this period

Rammed floors with post-holes and reed impressions

on clay lumps besides brickbats, occasionally found in heaps of debris from the levels of Period II indicate that normal constructions of *wattle and daub*, timber and mud were in vogue and mixed structural features might have also been in use in rich constructions where brick-masonary was also added in the traditionally accepted forms of construction. Evidence of hearths were noticed on the working levels of the habitational deposits of this period in square ZE-5. Significant finds include bone points, arrow-heads, stone beads, terracotta figurines, iron and copper objects, a bull-shaped pendant with gold foil, silver and copper punch-marked coins, uninscribed copper cast coins, a clay sealing with damaged legend ending with —— *nasa* in Brahmi. Besides earlier surface collection of two sealings with the legend of *Dhamalatasa* in the Brahmi script of third century BCE with *Swastika* symbol and the other with Brahmi legend *Akatha* of the same period.

Period III

Period III or the Sunga period is characterised by the absence of NBPW, though red ware and black-slipped ware continued as main ceramic industry (Figs. 8-9). Use of black-slipped ware declined and it was confined to making of bowls. Dishes were rare and almost disappeared. Red ware, both plain as well as slipped, continued with the diagnostic type being incurved bowls found in association with vases, cooking pots, miniature pots, lids etc.

A large number of uninscribed copper cast coins and various types of copper coins of local rulers of Ayodhya dynasty such as Dhanadeva, Satyamitra, Aryamitra and Dhamadata have been found during excavations and also from surface which suggests that the site was under the Sunga rulers of Ayodhya branch who separated their kingdom towards the end of the second century BCE from Magadh and became part of the kingdom of Kosala of which it formed part originally in previous periods too. Four clay sealings with the legend *Idadevasa (Indradevasya)* in Brahmi characters of circa 2nd-1st centuries BCE alongwith Ujjaini symbol were found from the levels of period III in which one has the letters written from right to left. One sealing of the same period has Brahmi legend *Nathadevasa*. Beautiful terracotta plaques (Pl. 1, Fig.14) were found during excavations representing *yakshis*, Gajalakshmi and *mithuna* figures. A burial of a cattle was also found sealed by the level of Period II. Structures as noticed in the previous period continued during the Sunga period also suggesting no basic change in the traditional concept of building activity which gave preference to timber and mud structures.

Period IV

Building activity increased during the Kushan period when burnt-brick structures were erected. The deposits of this period were the latest deposits noticed in the top layers at the site which have suffered much damage during the recent years mainly due to levelling of land for cultivation as evident from the spread of brick debris throughout the top layers. Although burnt brick structures and rammed floors have been noticed, but no proper house plan was encountered. Terracotta tiles were also found from these deposits which give an idea of the superstructure and roof of buildings. Three ring-wells and a brick-well were found during excavations belonging to the Kushan period. Amongst the three ring-wells, one was exposed in Qd 1 of Sq D1 cut through earlier levels with fifty-two rings, each being 13 cm to 15 cm in height with a diameter of 80 cm. Lime was used to seal the gaps between them and they were sunk upto the water table (Fig.10). The brick-well (Pl. 2) was exposed in Qd 2 of E1 and Qd 3 of ZE 1 with fifty-seven courses of wedge-shaped bricks measuring 26 x 24 cm to 30 x 8 cm. These structures of Kushan period found on the eastern slope of the mound suggest existence of the residential area there. Towards north-west of this, around the highest part of the mound and to the north of the Ram-Janaki Temple, remains of a workshop of metal smiths was located which existed from the late levels of NBPW period to the Kushan period. Slag, complete and broken pieces of crucibles and metal pieces of iron and copper were found besides hearths of various shapes and sizes in Qd 4 of Sq ZA5. Natural nodules having metallic contents were noticed on surface and from various levels in excavations suggesting workshop for metal work at the site.

Red ware including fine red-slipped variety was the main ceramic industry of the period (Figs.11-12) and the typical Kushan shapes like sprinklers, ink-pot lids and thumb-impressed incurved bowls have been found besides basins with nail headed rims, cooking pots, spouted pots, vases and handled pots and pans. Terracotta

animal and human figurines including heads with foreign ethnic features, Naigameśa and Naigameśī figures (Fig.13), mother goddess figurines, Kushan copper coins and terracotta pestles (Fig.15) were found from upper levels.

More than four thousand animal remains from the site were studied by U.C. Chattopadhyaya of the University of Allahabad. The animal taxa identified include Zebu, i.e. humped Indian cattle *(Bos indicus)*, buffalo *(Bubalus bubalis)*, horse *(Equus caballus)*, sheep/goat *(Ovis/Capra)*, spotted deer *(Axis axis)*, antelope *(Antelope sp.)*, wild boar *(Sus scrofa scrofa)*, domestic pig *(Sus scrofa cristatus)*, pigmy hog *(Sus silvanius)*, dog *(Canis familiaris)*, cat *(Felis sp.)*, hare *(Lepus sp.)*, common rat *(Rattus rattus)*, bandicoot rat *(Bandicota bengalensis)*, tortoise (at least two species –*Chitra indicus* and *Trionyx gangeticus*) and fish of large, medium and small size, and Aves including fowl *(Gallus galliformes)*.

The overall picture from the lowest to the uppermost levels at the site suggests a predominantly domesticated economy in which cattle have the largest representation. Other domesticated animals include sheep/goat, pig, dog and cat. A large specimen (a molar) of horse from layer 7 of Trench ZA3 (Quadrant 3) suggests that domesticated horse was introduced in this area. At the same time aquatic animals, like tortoise and fish, constitute an important source of human diet of the settlers who had the proximity of the river at the site. The remains of bandicoot rat and common rat suggest well-settled life, associated with storing grains. A few wild animals were also hunted including wild boar, pigmy hog, deer and antelope.

The fact that most of these species (excluding perhaps dog and cat) constituted items of human diet as is shown by the characteristic cut and chop marks observed on the bones. Another important feature of faunal assemblage is the occurrence of worked bones. A number of pieces from cattle metatarsus (compact tissue) were flaked to give shape of bone tools.

Besides antiquities like coins, sealings, terracotta plaques and figurines mentioned above, other important finds include terracotta animal figurines (Fig.16) such as horse, bull, ram, elephant etc., pestles, body parts of human and animal figurines, ear studs, toy carts including bird shaped ones (Fig.17), wheels, large wheel-cum-pendants (perhaps medallions used as cattle ornaments), gamesmen, balls, double perforated wheels, dabbers, skin rubbers, discs, two prismatic objects, net sinkers, rattle and other miscellaneous terracotta objects, tablets or weights, stoppers, stamps, ghata shaped beads, arecanut shaped beads, decorated and plain beads, extra large beads, bangles having plain surface decorated and having circular section, flat triangular section. Bone and ivory objects have also been found which include points alongwith a hoard of one hundred and thirty five fragmentary bone points, arrowheads with tangs at bottom with hole, with sharp edges on both sides and other types, decorated objects and bangle pieces. Crucibles and stone grinder, muller, quern, pestles and chert weight, iron nails, rods, arrowheads, sickle, broken swords, rings, hooks, knives, spear heads, wheel, etc., were also found from different levels. Glass bangles, rings, and other objects including studs of rings and beads, besides beads in ivory, coral, semi-precious stones – carnelian, agate, chlorite, jasper, quartz, chert, amethyst and chalcedony were significant objects recovered from excavation (Pl. 3). The copper objects found include antimony rods, rings (one with a figure of lion), bangle, wire, sheets, hairpin, button, bracelet, fish hooks, stud, small bell and needle.

Acknowledgement

I am grateful to the Director General, Archaeological Survey of India, New Delhi for giving me an opportunity to excavate the site for two seasons. The site was visited by me from my childhood in the company of my grand parents, father Prof. C. Mani, mother Mrs. Prema Mani and uncle Sri C.D. Tripathi, IAS, who all encouraged me from time to time besides my wife Dr Sushma Mani and children Ishan and Ekta who stayed with me in the excavation camp for days together. I feel proud to acknowledge the hard work of all my assistants from Excavation Branch II, New Delhi, of the Archaeological Survey of India including S/Sh. K.K. Sharma, Vishnu Kant, late Ajay Kumar Srivastava, B.K. Chauhan, L.S. Mamani, V.P. Verma, Y.S. Nayal, Vinod Kumar, R.S. Rana, late Chandra Bhan, Ajai Kumar, Virendra Pandey, T.Z. Dani, Bhuvan Vikrama, Sushri Mishra Vikrama, Pratap Kumar Naik, Suresh Chaudhary, Charan Singh, D.N. Yadav and Mohan Sharma. I am thankful to S/Shri

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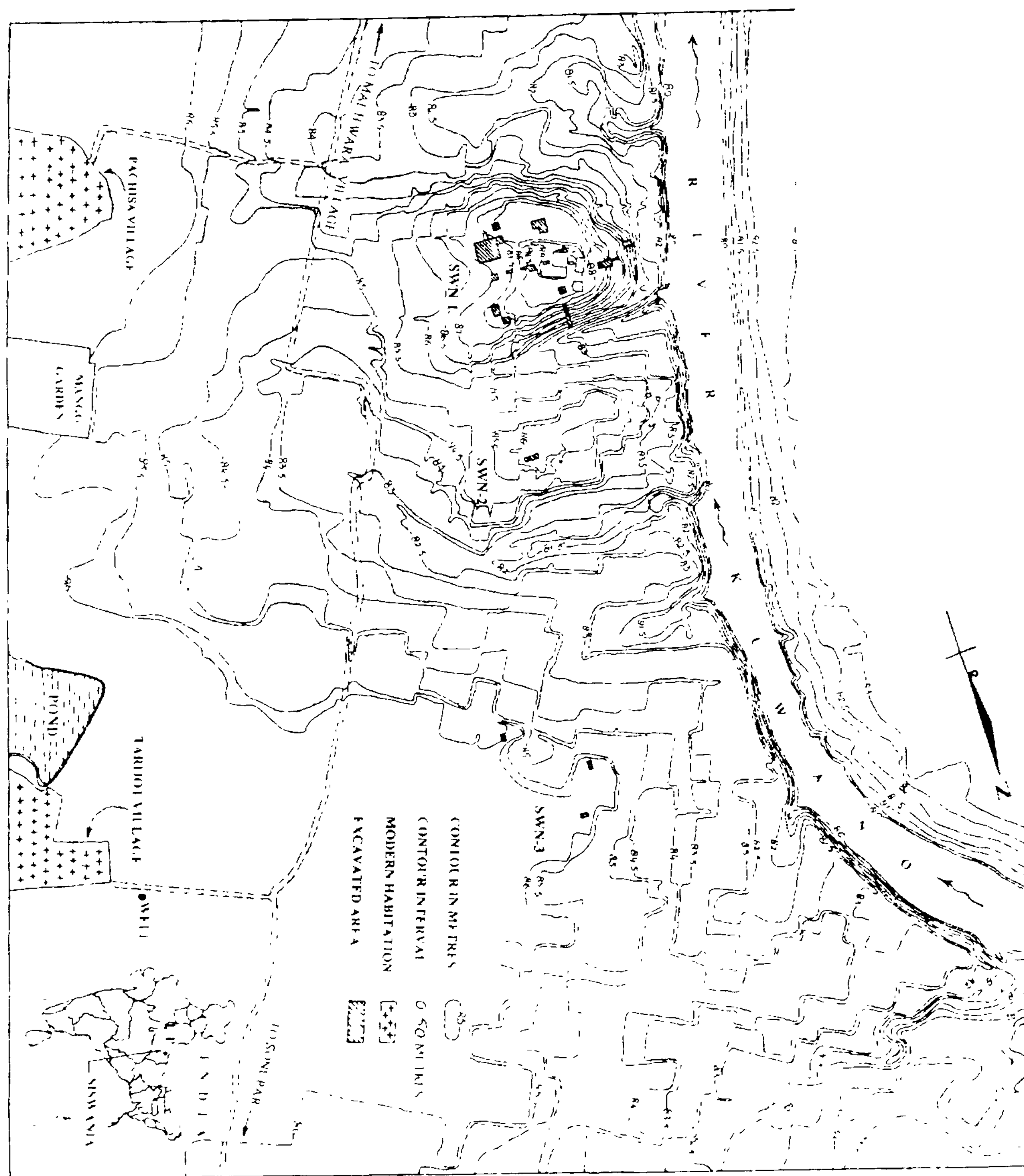


Fig. 1. Siswania 1995-97 District Basti, U. P., India Contour Plan

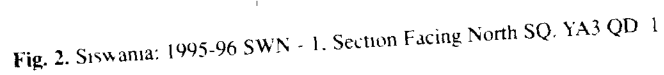


Fig. 2. Siswania: 1995-96 SWN - 1. Section Facing North SQ. YA3 QD 1

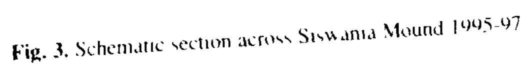


Fig. 3. Schematic section across Siswania Mound 1995-97



Fig. 4. Pottery Period I (Red ware)

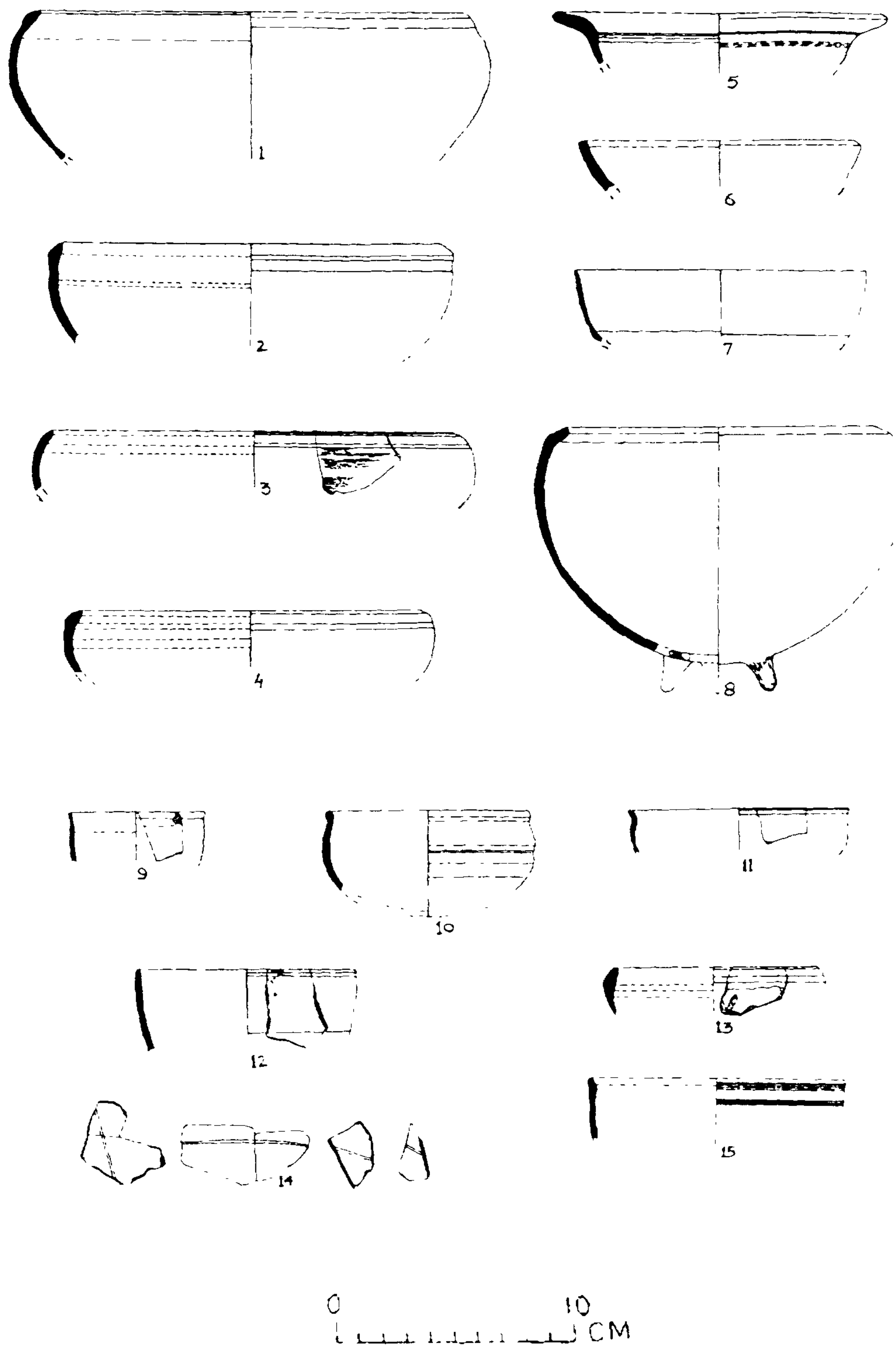


Fig. 5 Pottery Period I (Red ware, Black-slipped ware)

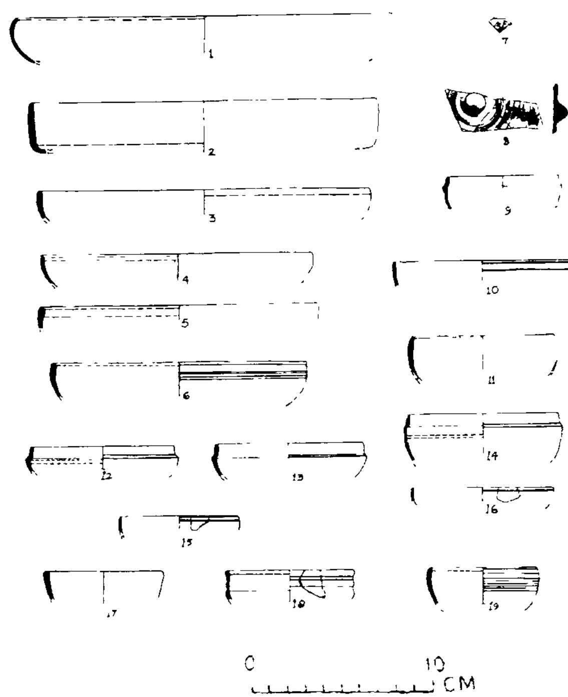


Fig. 6. Pottery Period II (NBPW)

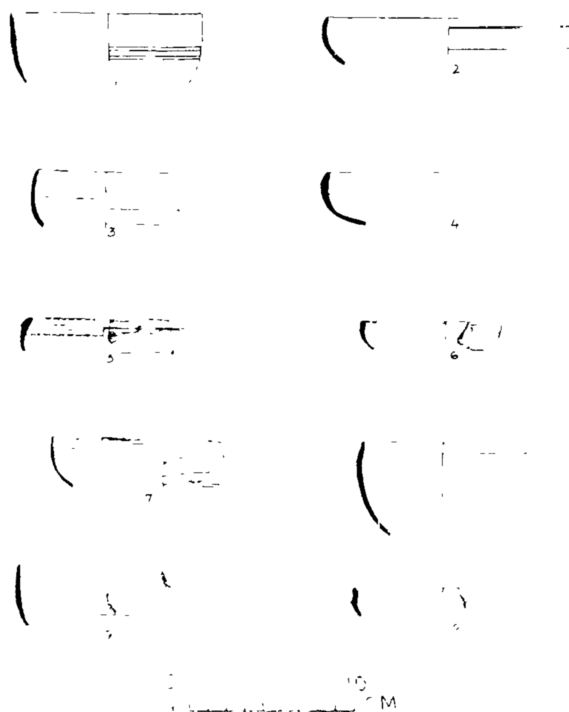


Fig. 7. Pottery Period II (Black-and-red ware)

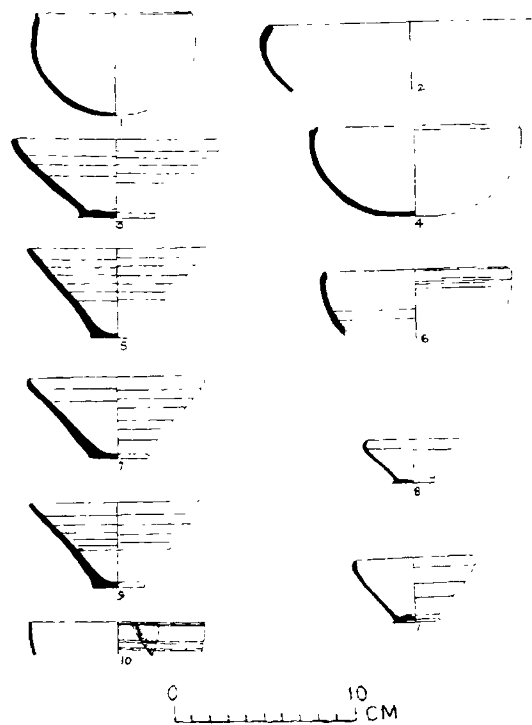


Fig. 8. Pottery Period III (Red ware)

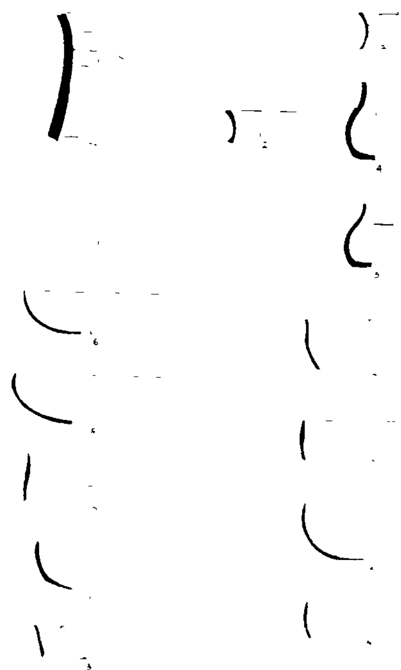


Fig. 9. Pottery Period III (Black-slipped ware)

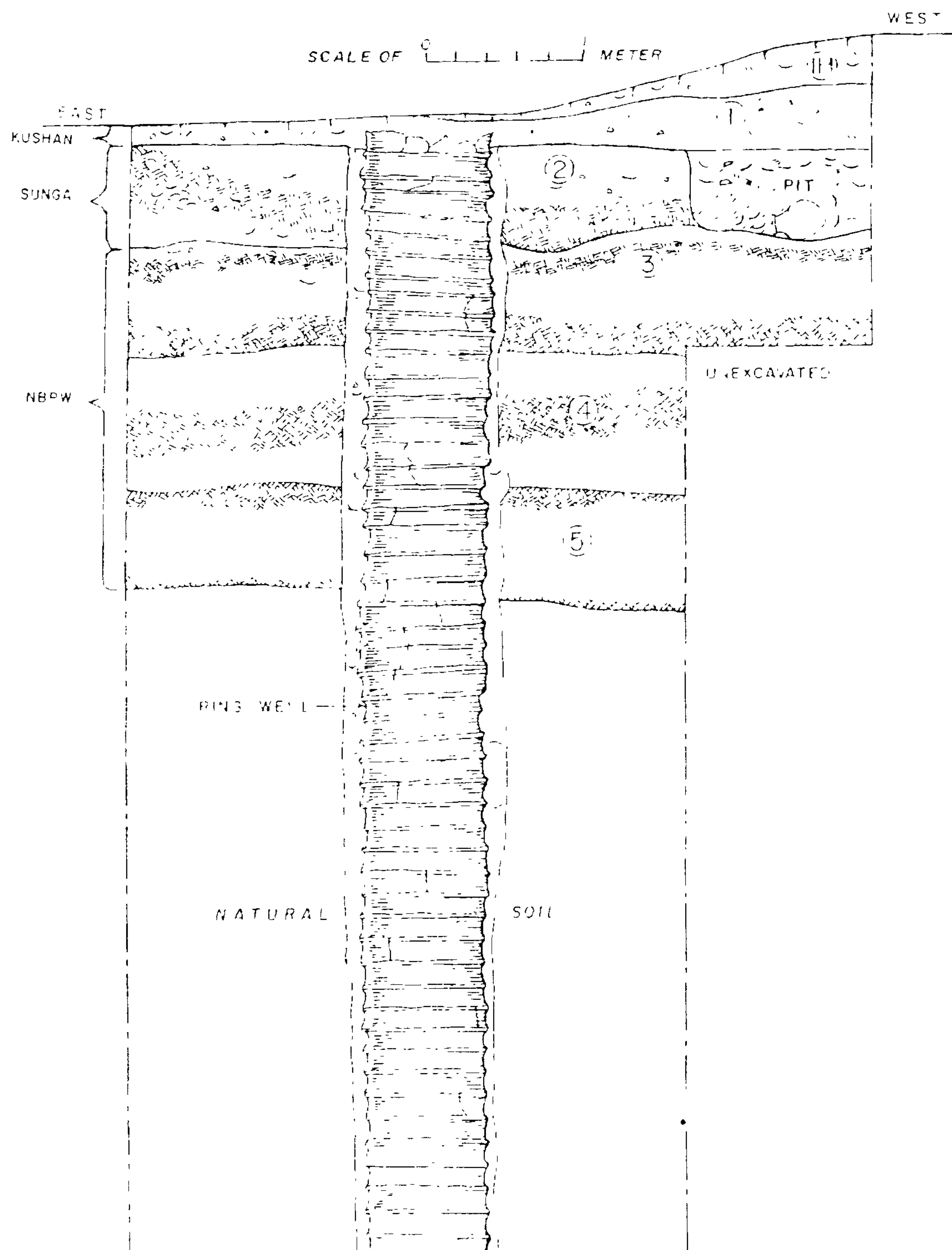


Fig. 10. Sisvania 1996-97 SWN - I Section Facing North SQ D1 QD 1

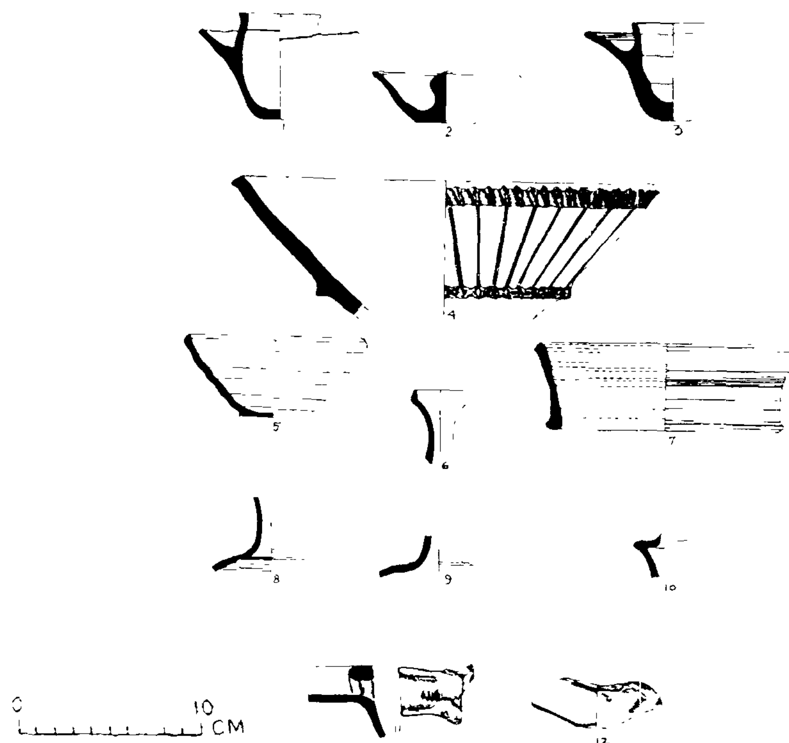


Fig. 11. Pottery Period IV (Red ware)

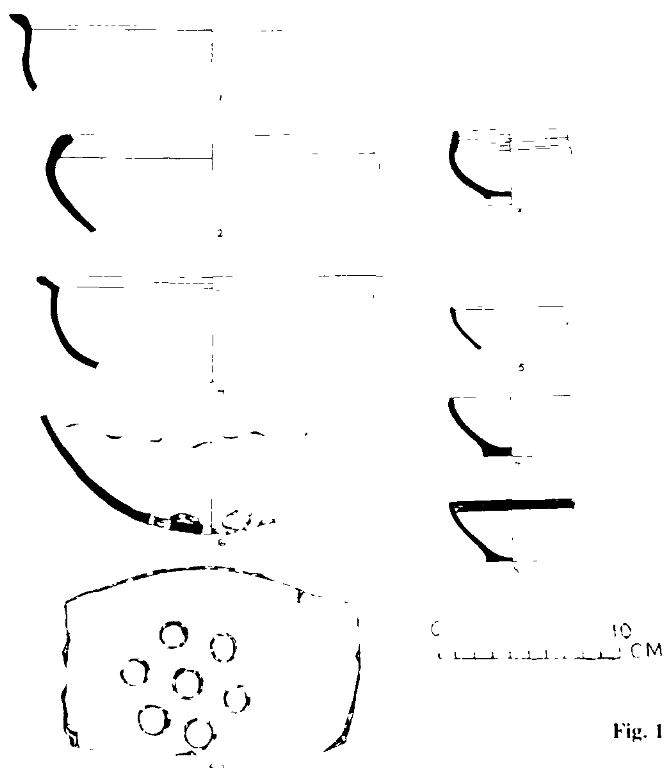


Fig. 12. Pottery Period IV (Red ware)

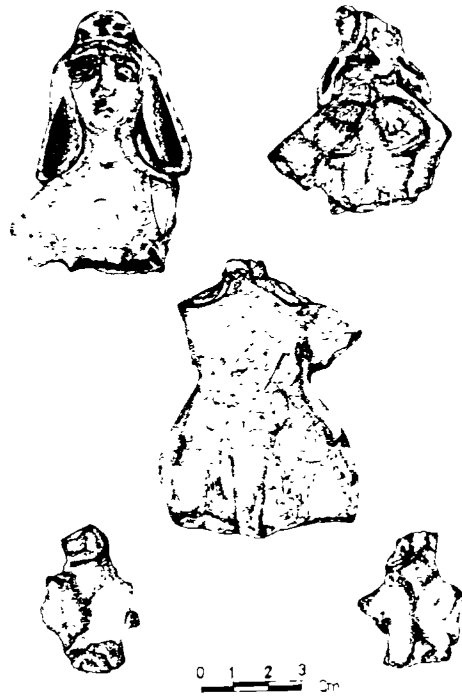


Fig. 13. Terracotta figurine (Period IV)

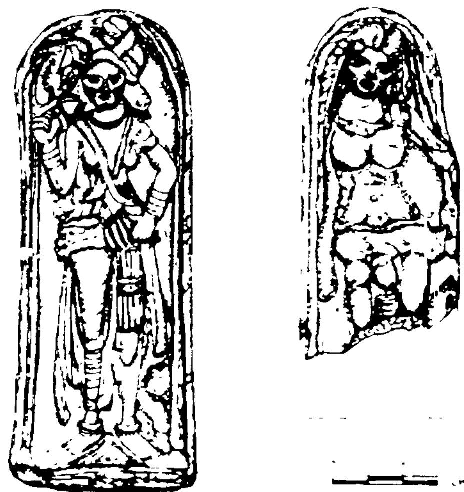


Fig. 14. Terracotta plaques (Period III)



Fig. 15. Terracotta pestles (Period IV)



Fig. 16. Terracotta animal figurines

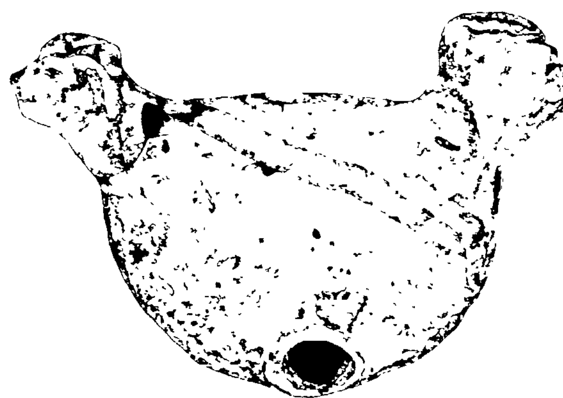


Fig. 17. Terracotta toy cart (Period III)

Excavation at Kopia: A Preliminary Report

A.K. KANUNGO AND V.N. MISRA*

The village of Kopia (26° 52′ N; 83° 4′ 50″ E), is located on the Khalilabad-Bakhira road at a distance of about 12 km north of Khalilabad town in Sant Kabir Nagar district (erstwhile part of district Basti), Uttar Pradesh. Khalilabad is approachable from most of the towns by both train and bus and from there any bus/jeep going towards Bakhira goes via Kopia. The archaeological site, consisting of a prominent mound, is located on the western fringe of the village. It extends over an area of about 1 sq km and has a height of about 12 m from the surrounding ground level. This early historic site is reported by many, since early last century, as a site which produced glass in large quantity. The mound is fortified and surrounded by moat. The mound is partly inhabited with houses built of bricks removed from the mound, and the rest of it is under intensive cultivation, leaving only an area of about 200 sq m intact. Though the bed of the Ami has moved far more or less away, when the site was occupied it was flowing near the settlement

Geomorphic Observations

The geomorphic observations around the site were done by S.G. Deo and S. Ghate. The river Ami originates near Jamuta, district Basti. It flows from northwest to south and meets river Rapti at Sohgaura The average elevation of the area is 95 m, and it has a low gradient. Geologically the area is a part of the Gangetic flood plain

Preliminary geomorphic observations of central part of the river are based mainly on the toposheet 63 N/1 (1″ = 1 mile) and IRS 1-D image.

The archaeological site of Kopia is on the right bank and 3.5 km away from the present channel of Ami river (Fig. 1). It is on the flood plain between river Churma in the east and river Ami in the west. The mound is close to a dried-up lake, which was a part of an ox-bow lake. It is clear after image processing that the site is on the right bank of a cut-off horse shoe shaped meander. The cut-off meander represents the palaeo-channel of the Ami. The present channel is very narrow but perennial. The mound is located on a higher surface, which separates the Ami basin from the Rapti river. The location map shows the presence of a number of natural lakes (locally known as Tal) almost parallel to the present day Ami river and on both sides of its channel. The lakes are of varied shapes and sizes. They are the remnants of old meandering channel of the Ami. Very few tributaries join river Ami on the left bank as compared to the right bank. The width of the palaeo-channel was 5 to 7 times more than the present channel of the Ami. This suggests more discharge of the river in ancient period.

Excavated Area

The site was chosen for excavation because of its fairly large size, considerable thickness of the habitation deposit, good state of preservation, and ample evidence of ancient glass

The entire area of the mound after it has been cut for roads on all sides (Fig. 2) was put on a grid of 5x5 m trenches. Nine trenches, named AY1, OB1, OB2, CCX4, CCX5, CDX11, CDX12, CEX11 and CEX12, covering an area of 112.5 sq m were excavated. Of these, the first two were excavated fully. Of the remaining, in the OB2 (NW & SW), CCX4 (NW & SW) and CCX5 (NE & SE) two quadrant were excavated in each, in the remaining CDX11 (NW), CDX12 (NE), CEX11 (SW) and CEX12 (SE) only one quadrants each has been excavated. Trench AY1, OB1 and OB2 lie in the centre of the mound, CCX4 and CCX5 were on a small surviving slope of the mound and CDX11, CDX12, CEX11 and CEX12 were on the disturbed and ploughed northern slope of the mound. These areas were selected considering the richness of the glass finds on the surface. Since the total cultural sequence of the mound could not be recovered in this season and considering the distance and disturbance of the trenches, it was preferred to treat them in three localities. Thus AY1, OB1 and OB2 where AY1 was dug up to 2.10 m depth were marked as locality I, CCX4 and CCX5 which were 7.34 m down from the datum point at AY1 were dug down to 1.58 m and were marked as locality II, and CDX11, CDX12, CEX11 and CEX12 which were 11.44 m down from the datum were exposed down the virgin soil and were marked as locality III. Relatively large (50 sq. m) area was excavated in locality I as this was considered to be the main activity area due to its location in the central part. In the remaining two localities the excavation was aimed mainly at identifying the glass manufacturing area and the extent of the habitation.

Stratigraphy

The findings of the excavation are of much archaeological and historical interest. Though complete stratification could not be obtained, the earliest evidence seems to be that of Northern Black Polished Ware (NBP) of about 6[th] cent. B.C. Over this layer is Sunga-Kushana occupation and sporadic evidence of Muslim period.

Locality I: In this place 3 trenches were taken out of which in trench AY1, digging was carried down to 2.10 m, in OB1 down to 1.5 m in NW and SW quadrants down to 0.98 m, in NE and SE quadrants. Of the trench OB2 only NW and SW quadrants were excavated. Almost all the cultural finds were of the Kushana period. Two layers were visible below the humus layer and the debris. On the top the local cultivators had piled up collected bricks before 1980, when the site was declared state protected. With time these bricks got settled and compact. Thus we had to remove about 25 cm from the top and 55 cm on the slope. After humus layer was removed, the trench surface was more or less horizontal.

Layer 1 begins at a depth of 42 cm from the surface and ends at 162 cm, it is exactly 1.20 m thick. Layer 2 continues down to a depth of 210 cm, at which point digging was stopped. In this layer though all the finds are of the Kushana period, a few sherds of NBP were also found.

Locality II: This locality was 7.34 m lower than the highest part of the mound at AY1. Digging was stopped at a depth of 1.58 m the upper 0.92 m was layer I and the rest was layer 2. Though the pottery and terracotta figurines matched those of locality I, this locality has got more Saiva worship elements among the antiquities. These include two terracotta Siva lingas and a few lamps besides a red slipped sprinkler.

Locality III: Four quadrants of four trenches were exposed. This location was at a level of 11.44 m below the datum. Upper deposit of this locality has been completely destroyed by brick robbers, and cultivators have more or less ploughed down to virgin soil. Even then it was selected for exposing, since glass and crucible pieces are found to be *in situ*. Maximum deposit exposed was 39 cm.

Structures

In locality I, excavation revealed remains of walls of a regular structure. They were constructed of fired bricks of 37x22x5 cm and 35x23x6 cm sizes. A few pieces of bricks exposed in the southwest corner of trench AY1 are of the size of 22x22 cm (thickness is not yet exposed). They are joined with clay mortar. The floor was made of rammed bricks and mud. In trench AY1, there is a burial chamber with animal burial. The burial clearly seems to be of the later Kushana period from the coins and bricks found with it. This chamber seems to be part of a house which would probably surface in the trench to the south of AY1, since the main wall is in the south section of this trench and it extends towards east into unopened OA1

trench. Thus the whole burial chamber is yet to be exposed. Surprisingly, the burial is found in a heap of pottery and with lot of burning activity, even the burial is charred. In the northern section there appears a very disturbed L shaped structure and in the north-west corner a circular well/bastion type structure was becoming visible. Throughout these trenches finding of tiles suggests use of tiles for roof.

In the eastern section of trench OBI, a collapsing wall is seen which merges with the rectangular structure of trench OB2.

Layer I ends with a huge platform in the northern end of CCX4 with bricks of 22x22 cm.

Pottery

The excavation in locality I revealed a relatively high percentage of potsherds of different wares and an animal burial, indicating evidence for human habitation in that part of the site. In localities 2 and 3 the quantity of pottery is relatively low. However, artefacts found here suggest that this was an area of glass manufacture. The study of pottery has been made by V. Shinde, A.K. Kanungo, P Shirvalkar, and A. Kulkarni.

Different ceramic wares were distributed evenly in locality I, both horizontally and vertically in the excavated area. In the southern part of trench AY1 there was an unusually high concentration of pottery. Digging led to the discovery of a large number of animal bones confined to a small area enclosed by brick lining. Inside the brick lining area were found three broad layering patterns The area had a concentration of animal bones sandwiched between thick layers of pottery. Most of the pottery found inside was relatively intact, indicating that it was purposefully placed and was not a dump. This evidence most probably has some connection with the religious beliefs of the people

The pottery found at Kopia is uniform throughout the excavated deposit. On the basis of the quality of clay, techniques of manufacture and firing, surface treatment, decorations and shapes, the pottery can be divided into five wares:

1. Red slipped ware
2. Red ware
3. Micaceous red ware
4. Black and red ware
5. Black ware

Red Slipped Ware

This is the most predominant ware at the site representing more than 70% of the total ceramic assemblage. The ware is made from fine clay to which was added small percentage of tempering material consisting of fine to coarse sand, chopped grass and occasionally rice husk. The entire ware is made on wheel. It is slightly ill-fired as a thin black streak is noticed in the centre of the core. The remaining portion of the core is fired to brick red condition indicating oxidization. The ware can be divided into thin and thick varieties. Most of the characteristic features mentioned above are more applicable to the thick variety. The thin variety found in relatively small quantity, is very fine and perfectly fired. A few particles of sand present in this variety indicate that occasionally sand was added as a tempering material. Both the varieties bear horizontal incised bands consisting of two or more lines. Usually on the neck portion of the storage vessels a low ridge is found which was most probably made for aesthetic purpose. The pottery is treated with a thick red slip. The most characteristic shapes of this pottery are large globular storage jars with wide or narrow mouth and constructed neck, medium-sized basins, small to medium-size cups, small to medium-sized globular pots and possibly dough plates. Other common shapes found in this ware include globular pots of small to medium size, large to small cups, small sized basins and lids. The globular pots have wide or narrow mouth. They have either short out-turned rims or have small vertical necks with short flared out rims Besides, this ware also includes a few sprinklers and spouts which taper towards the end and are characteristic of the Kushana period The spouts found in large numbers are of different sizes and diameters. Some of them bear even decoration with incised lines and low ridges Some of the spouts have wide opening and small beaded rims. Very rarely vessels like suraahi with narrow mouth, vertical neck and flat projecting rim are also found The ware is occasionally decorated with incised lines, punctured marks, and applique bands around the

neck portion. Some of the potsherds bear horizontal bands of dark red colour on their outer surface.

A Unique Decorated Pot

At the depth of 2 m. which was the maximum level excavated at the site was found a very fine specimen of red slipped ware (Pl. 1, Fig. 3). The upper half of the pot is intact whereas the lower portion is missing. The significance of this pot is that it enables dating of the level in which it was found. The pot bears uniform slip of red colour which is burnished. It is made of a high quality clay and is fired perfectly and uniformly to a high temperature. The entire pot is wheel made but it appears that the rim portion was made separately and luted later. The pot is perfectly globular in shape, has a short vertical neck and short flared out rim which has a nail headed profile. It is profusely decorated with incised, punctured and stamp motifs. On the rim portion two parallel incised grooves and similar pattern on the centre of the neck portion are seen The shoulder of the pot is flat and is profusely decorated with incised and punctured patterns. It consists of a panel between a low thin horizontal ridge in the upper part and punctured marks triangular in shape at the end of shoulder portion. Between these there are two superficially incised horizontal lines. Between the low ridge and these horizontal lines are incised 'Y' shaped patterns all around the neck portion at regular intervals. On the body portion just below the shoulder is a stamped decoration which can be identified as *nandipada* There are four such motifs around the pot placed at regular intervals. This motif is very important as it could be used for dating not only the pot but the level in which it is found. It should be mentioned that such motifs are often found stamped or impressed on the Kushana coins of 1st and 2nd century AD. The concept of stamped pottery was introduced from the Kushana time. The stamped motif of *nandipada* on the pottery suggests that the latter belongs to the Kushana period. The surface treatment of the remaining pottery found in the Kushana level is identical to that of this pot A few potsherds found on the surface bear similar kind of motifs along with sun motif. There appears to be some variation in the nandipada motif.

One of the best specimens in the red slipped ware is a spouted bowl which was collected by the villagers while they were indiscriminately digging at the site It is a very well made circular deep bowl with a prominent channel spout and a small projection just opposite the spout for grip purpose. The end of this flat projection bears two pinchings made by finger-tip. The bowl is rimless but the upper portion is made externally thick and flat on the top giving impression of a rim. On the flat portion on top are incised a group of such strokes. Six such groups are found spaced at regular intervals. At the base of the pot is a small intentionally made perforation.

Micaceous Red Ware

The very term indicates the presence of mica in the pottery which is quite visible on both the inner and outer surfaces of the pottery. The mica is not added in the clay but in the slip which is applied on both the surfaces. Occasionally in some of the specimens, mica particles were found in the clay. Mica is intentionally added in the clay as it facilitates firing. The fabric of this pottery is more or less same as that of the red slipped ware. It is thin to medium thick. The thin fabric looks brittle whereas the thicker one is more solid. Both are fired perfectly. In the case of thin variety grass and rice husks were added as tempering material. Occasionally the ware is decorated with incised horizontal lines on the outer side of the neck portion. The ware is treated with light orange colour thin slip which. It is represented by limited shapes which includes mostly globular pots with high neck and beaded rim, basins with ledge, bowls with incurved sides and flat-topped rim and small globular lota. There is one specimen of a wide-mouthed shallow basin with a loop handle attached horizontally to the rim portion. The decoration comprises incised patterns and bands painted in either red or black colour. The entire ware is wheel made but it is not as fine as the red slipped ware.

Black-and-Red Ware

The black and red ware found at Kopia is different from the black-and-red ware found at protohistoric and historic sites elsewhere. Considering the fact that only a few sherds were found in the excavation it can be surmised that it was not locally manufactured but came to the site from elsewhere as a result of trading contacts. Only body sherds have been found. Close observation of the sherds reveals that there are two varieties, one coarse and the other fine. The coarse variety, which is dominant, appears to be handmade and ill fired. Its inner portion is

black and the outer surface was treated with a light orange coloured slip. The fabric of this ware is quite coarse as it includes considerable amount of tempering material in the form of sand The inner surface indicates impression of rice husk.

There are a couple of sherds of fine variety which are made from fine clay, relatively better fired and treated with thick dark red slip on the outer surface. The inner surface is black. They are wheel made.

Black Ware

This ware is again represented by only a few sherds. It is both coarse or fine and slightly ill-fired. The coarse variety is represented mostly by globular pots with beaded rims and decorated with incised patterns and nail marks. There are also a few cup-shaped lids with a central knob. The thin variety is represented mostly by small globular pots with or without carination and wide-mouthed shallow convex bowls with flat rim. The ware is thin in section, coarse in fabric and ill fired. The outer surface is treated with black slip which also contains mica particles. The uneven thickness of the potsherds indicates that it was made on slow-turn table. Considering its small quantity at the site, this ware appears to be an import.

One of the best specimens in the black ware is a small container (Fig. 6) which was collected by the villagers while they were digging at the site. It has a broad, slightly convex base with a deeply incised groove on the outer surface. The sides slightly taper upwards and end into incurved and narrow opening It has two parallel grooves superficially incised on the body portion. It does not appear to be a normal pot but looks like a small measure It should be mentioned that similar measures of different sizes and dimensions are in use in rural India. They are used for measuring quantity of grain or even for precious liquid

NBP Ware

In the lower levels of the excavated portion were found a few sherds of NBP ware. The variety found here is much inferior in terms of fabric and surface treatment to the classical NBP pottery found in the Ganga valley. Only body sherds have been found. It is quite likely that these sherds belong to fag end of the NBP period.

Glazed Ware

In the upper levels of the site a few sherds of glazed ware belonging to the medieval period were found. They belong to one uniform ware which is red and made of fine clay. It is treated with thick glaze brown in colour. Only body sherds were found. The shapes include narrow and wide-mouth pots as some of them, possibly of wide mouth variety have glaze on inner side also.

Besides this glazed ware the site has also yielded a few Muslim coins indicating the presence of the Muslim habitation at the site. In the excavated portion however the stratigraphical position of the Muslim period is not yet clear

Red Ware

The red ware which is both thin and thick is equally predominant at the site. This ware does not appear to be slipped but has got the red colour because it was fired in oxidizing condition. The thick variety which is coarse is mostly represented by storage jar. The medium thin variety is represented by globular pots with out turned rims or rims with flat projection, large to medium size shallow convex bowl, cups with flaring sides, incurved rim and flat base and basins with or without ledge. Shapes which are very rare include deep saucer, loop handle, cup-shaped lids with a big hole in the centre and flat tiles with a hole The only decoration in this ware is incised either shallow or deep horizontal lines in a group.

A very fine specimen of a small goblet (Fig. 4) found at the site, has flat bottom, round body, concave neck and short vertical featureless rim, which is sharp at the top.

Buff Ware

This ware is also represented by both thin and thick varieties, the former being slightly finer compared to the latter Some of the sherds bear incised shallow decorations in the form of horizontal lines. In the thin variety two miniature pots were found on the surface. One of them is hand-made It has squat bulging body, narrow mouth and slightly everted rim. The other one is wheel made which has globular body, flat wide base, concave neck and everted rim. On the shoulder portion there are a group of incised lines.

Fine Grey Ware

A few sherds of fine grey ware have been found. It has a very fine fabric and the surface is grey and uniformly fired. It is a plain ware. It appears to be a degenerate form of Painted Grey Wares. It is represented by sprinklers and convex bowls with incurved sides.

Animal Bones

Animals bones were studied in detail by P.P. Joglekar.

1. The nature of preservation of the bones suggests that a large number of them have undergone post-depositional modifications due to physical factors.

2. A large number of bones are heavily charred and have been vitrified due to prolonged exposure to heat.

3. The animal species identified include domestic cattle, buffalo, pig, sheep, goat and domestic fowl and wild mammals comprises of spotted deer, four-horned antelope and hare. There are also bones of land tortoise and at least two varieties of freshwater fish.

Terracotta Figurines

Thirty-two terracotta figurines were recovered from the excavation and have been studied by MK Dhavalikar. Most of them belong to the Kushana period. One specimen, which is produced from a single mould can be assigned to the Sunga period (2nd-1st century BC). Almost all the Kushana figurines are fragmentary, broken at the joint; in the case of human figurines, at the junction of the head and the body. They are characterised by coarse modelling, and having large goblin-like bulging eyes. The head seems to have been mould made while the body is handmade, and both are then joined together. A few outsized figures are noteworthy. A female figurine may be that of Hariti, the Buddhist goddess or may be Parvati as such figures are commonly found in the Kushana levels in north Indian sites. The crude, goblin-like features are the result of the influx of tribesmen from the northwest in the centuries around the Christian era.

Metal Objects

Forty-two iron pieces or objects were found in the excavation: two arrowheads, five nails, out of which one is a pincer with fragment of ring, one is a plough blade, six small balls and rest are unidentified.

Arrowheads: One found in layer 1 of trench OB1 is with long barbs, of which tang is missing. Another found in the adjacent trench AY1 is of lanceolate shape, very long and slender, and tanged.

Of the three copper pieces, one well preserved and complete copper bangle with flat opening found in trench CCX5 is identifiable.

Coins

The coins found from Kopia: two pieces from the excavation and sixteen pieces were either acquired from villagers and found on the surface or in the possession of village people. These were studied by S. Ansari.

Of the excavated coins one is from layer 1 and the other from layer 2. The latter was found in the burial chamber. The coins are highly eroded and nothing can be studied except their shape, one is circular and the one from burial is square with rounded corners.

Out of sixteen copper coins from the surface five are eroded, three are partially eroded and only eight are in good condition. These coins fall in five categories, i.e. punch-marked (1), uninscribed (3), Kushana (6) Sultanate (1) and unknown (5).

Punch-Marked coin: This silver coin is probably from the Ashokan period.

Uninscribed coins: The uninscribed coins are probably from pre Mauryan/ Mauryan period. They are partially eroded and two have figures of crescent-on-hill, consisting of three arches in two tiers. They are supposed to be earliest cast copper coins.

Kushana coins: These coins are of three different rulers of the Kushana dynasty, one each of Wima Kadphises and Kaniska and rest are of Huviska (Pl. 2). These coins are in good condition and bear Kushana

monogram, nandipada, portrait of the ruler on obverse and deity on reverse and have dotted border. Greek script is partially visible in some coins.

Sultanate coin: The solitary coin is of the most powerful sultanate ruler Allauddin Khilji (1296-1316). The coin is Billan or is also called as Kani or Gani. The obverse has Arabic and Nagari script and reverse has Arabic script.

The unknown copper coins are highly eroded and nothing can be deciphered on them.

Seals and Stamps

One seal, one oval shaped un-baked smoky grey coloured terracotta sealing with square stamp and one rattle handle were collected either from surface or from villagers. Apart from these, two rattle handles were recovered from the AY1 trench during the excavation, one each from both the layers.

The seal was collected from a villager who had found it in a pit near the north fortification gate. It has square concave stamp and perforated long, rectangular knob. The stamp has a symbol of nandipada, sun and four sankh bounded by an incised line. At the foot of the knob is a design of a four-petalled lotus flower with lenticular incision in the middle of the leaves. An incised border frames the motif. The perforation was meant to string the seal with a thread. This seal seems to have been used as gate pass.

All three handles of rattle are shaped like a half-opened flower with separated petals.

Stone Objects

Out of seven stone objects, one is a broken pestle (conical in shape and nearly circular in section), three are polishers (one broken), two flat oval hammer stones (one is broken) and one flat and oval shaped pebble stone.

Beads

Of twenty-four glass beads (Pl. 3), one knot and two tubes of Indo-Pacific bead industry, six Indo-Pacific beads, two collar beads (one is millefiori), one folded bead, two segmented beads and one applique designed (white spirals on black), rest all are wound beads. Four millefiori rough out cut glass for making beads are also found. They are of blue, black, white, off white, green and golden yellow colours.

Of nineteen terracotta beads, 13 are arecanut in shape and two are melon shaped and rest all are oval shaped (two are half perforated) The nine terracotta balls are also found.

Of four stone beads two are of quartz and two are of banded agate. All are perforated from both ends.

Bangles

Of eleven terracotta bangle pieces three are flattish rectangular in section (on outer surface one has incised criss-cross lines and another is decorated with moulded herring-bone pattern), one is flattish rectangular in section of which outer side is decorated with a moulded long-stretched honeycomb pattern. The rest are roundish in section.

Altogether forty glass bangle pieces (Pl. 4) of different colours, mostly blue, green and black, are found. Of five bangle pieces are decorated with grooved strokes on the outer side.

Crucibles

Two crucible pieces (Pl 5, 6) were collected from the villagers. Of them one is intact. Two broken parts of crucibles were found in the excavation from trench AY1 in layer 1. They are of three shapes: one is conical shaped with grooved lines, it has mica in the body with a wide open mouth and at bottom a sliced hole; second one is typical crucible shaped with red slip on outer surface; and third is globular in shape Of this only a broken part is found, neither openings not the perforation is visible. Except the globular one none of them seems to have been used. Apart from these pieces hundreds of crucible fragments with glass melted in them were found in localities II and III.

Glass

Though glass was found in all the three localities,

locality II and III seem to have been associated with glass manufacturing because of the finding of hundreds of glass chunks, debitage and crucible fragments (Fig. 7) with glass melted in them. Locality III was littered with glass production debitage. Unfortunately, it has no scope of excavation because it is highly disturbed. Once it was exposed, it left no doubt that this was one of the areas where once glass was produced with numerous *in situ* crucibles, glass slag and a few pieces of sherds of large jar without any other cultural material. All findings other than surface ones were put in layer 1. However without having much cultural material from stratification it was not possible to date this locality. Morphologically the glass found from this and other two localities seems similar but analysis of samples will only confirm whether or not they are of the same period.

Other Antiquities

Some of the other important antiquities found in the site were:

Lamps (Fig. 5): A terracotta miniature votive lamp with 7 channels was found in layer 1 of trench AY1. In the same layer of adjacent trench, OB1, another terracotta lamp was found which seems to be of kaolin.

Dabber: Two terracotta dabbers were found from the surface of the site in locality II. One, with elongated body, rounded base and small knobbed handle is complete. The other one which is broken is with low body and has flattish knobbed handle.

Besides, two fragments of terracotta scrubbers, one terracotta plumb, six terracotta wheels of different sizes (some of them well fired), four well fired terracotta discs and five pieces of terracotta pestles were found.

Remarks

The finds leave no doubt that Kopia was the largest and best factory for production of glass and is by-products of its time and one of the major centres during the Buddhist period. But its interaction with other places and duration of glass production have to be found out. Questions like for whom the glass was produced and who controlled its production and its production technologies can be answered only after further and larger excavation.

Acknowledgements

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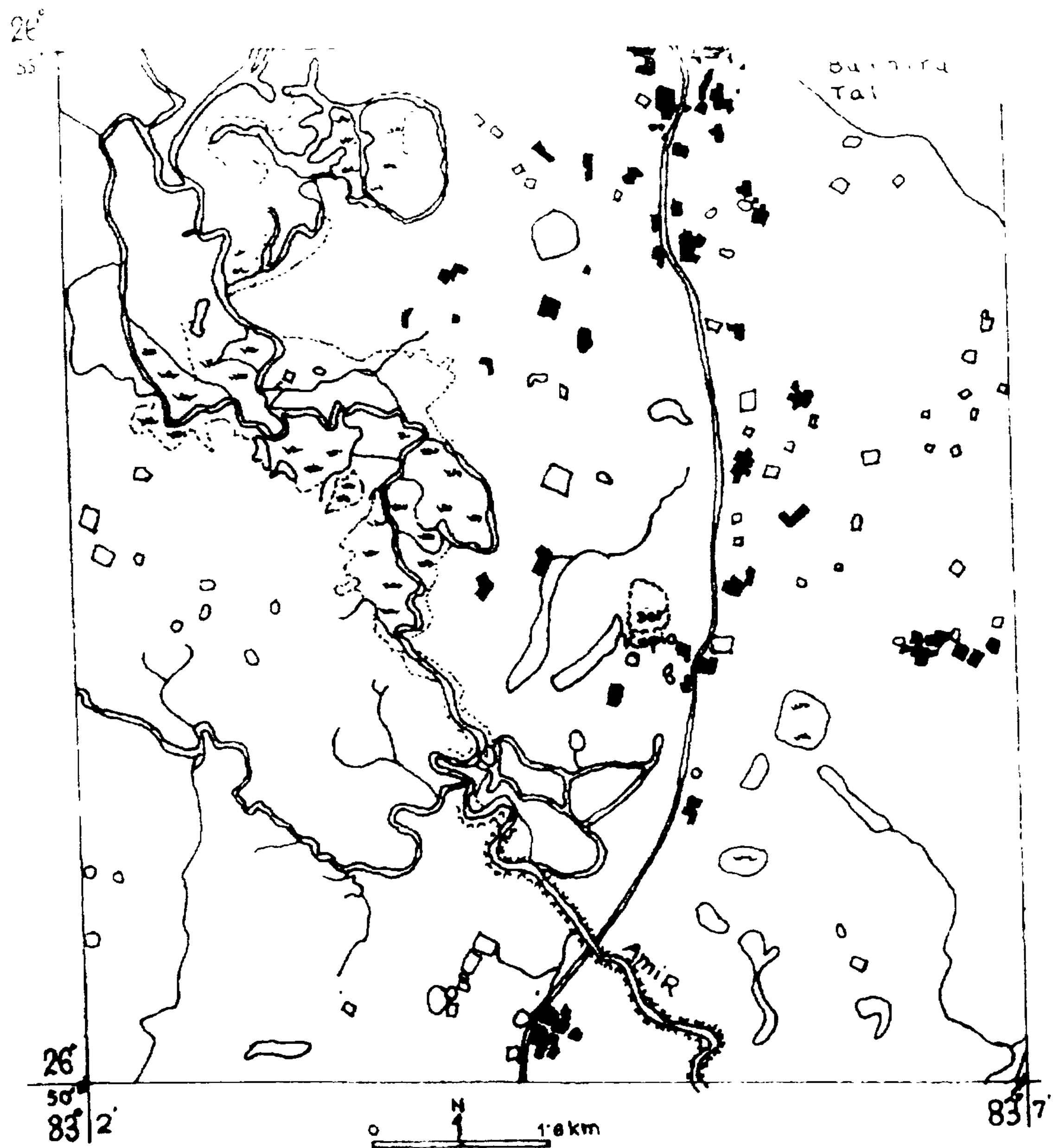


Fig. 1. Location of site Kopia on river Ami

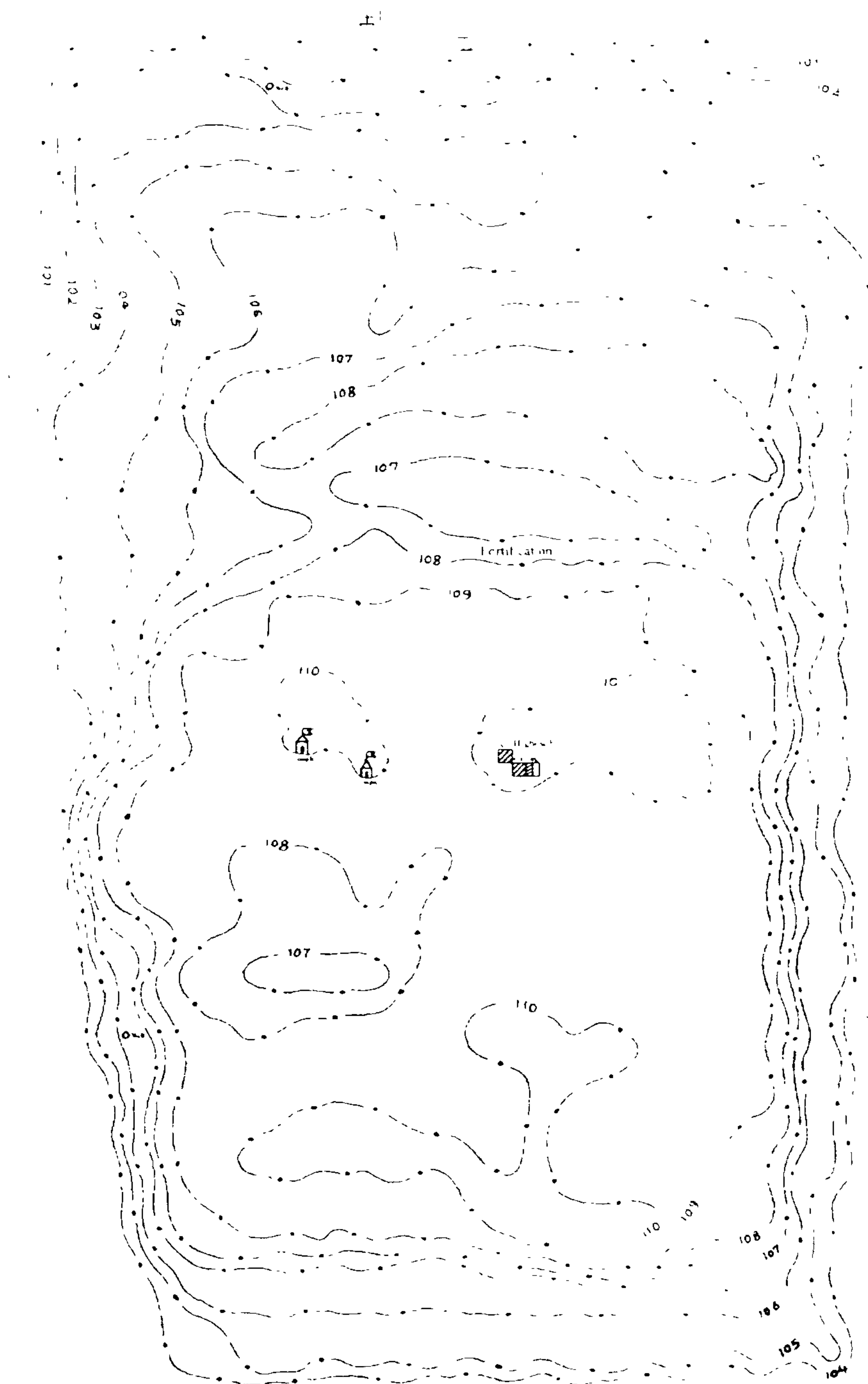


Fig. 2. Contour Map of Kopia, Sant Kabir Nagar, Uttar Pradesh

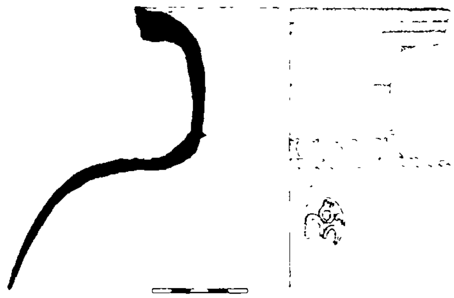


Fig. 3. Section drawing of the pot with Nandipada

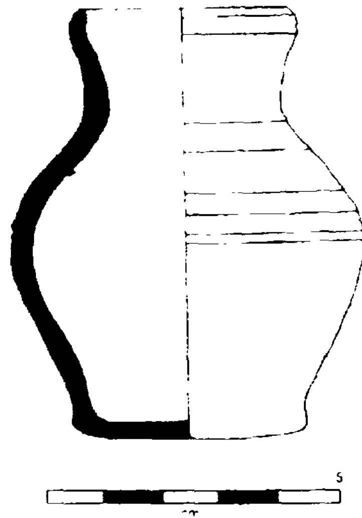


Fig. 4. Section drawing of the goblets (red ware)

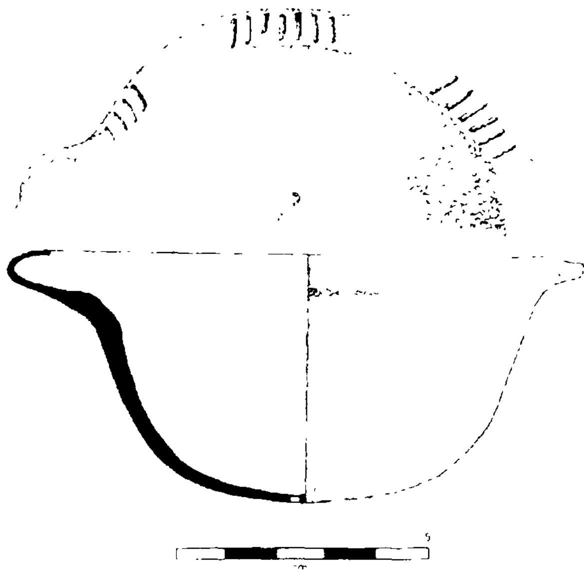


Fig. 5. Section drawing of a lamp

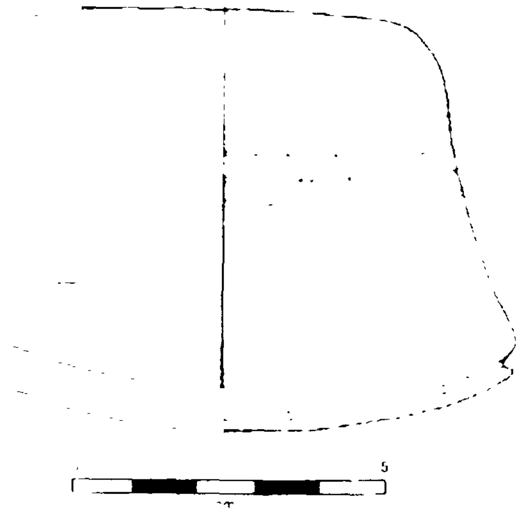


Fig. 6. Section drawing of the container

A Preliminary Report on the Early Historic Site at Shirwal in Satara District, Maharashtra

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Introduction

Several sites of the early historic period, particularly contemporary to the Satavahana dynastic rule, have been found in Western Maharashtra. These include rock-cut Buddhist caves and a few habitation sites. Although rock-cut caves have been found at many places and there were trade routes running in Western Maharashtra during the ancient period, the actual habitation sites are scanty. For example, in Pune district, caves at Junnar, Karle and Bhaje are well known. Yet associated habitational sites are not common or not preserved at such places. Recently during a rescue excavation an ancient site belonging to the Early Historic period has been found right within Pune metropolis (Shinde *et al.* 2002-2003). In Satara district, archaeological sites belonging to the Satavahana period are Wai and Karad of which the latter has been excavated (Anonymous 1949).

While investigating the basin of Nira and its tributaries for understanding Quaternary environment, the authors incidentally came across the habitation site of Shirwal. This note provides a summary of observations made at the site in field trips during May-June 2004. During the exploration, a late medieval temple complex was noticed at Potnis-Vadgaon located at about 8 km from Shirwal, where habitational debris has been seen. However, description of this site is not included except for a passing reference to pottery types. The main aim of this work is to highlight the potential of this region as far as the research in historical archaeology is concerned.

The Site and Geomorphological Observations

The site of Shirwal (18° 8′ N; 73° 59′ E) is located on the right bank of an unnamed low order ephemeral rocky stream joining the river Nira. River Nira, a tributary of river Bhima, is the boundary between modern districts of Satara and Pune. The site is to the east (about 500 m) of Pune-Bangalore National Highway (NH4) and is approximately 1 km south of present town of Shirwal (Fig. 1). Another site of possible early historic and medieval occupation has been found at Potis-Vadgaon near Naigaon, about 8 km upstream of the same unnamed low order stream. This stream originates on the northern slopes of Mandhardev's denudational surface (1400-1200 m AMSL) and has low sinuosity. Mandhardev range is an eastern extension of the grand surface of erosion of Mahabaleshwar hills with thick laterite cover of the Early Tertiary age. This stream flows over Deccan basalt (Wai Formation) that is free of dolerite dykes and is dominated by 'aa' types of basalt (Gazetteer of District Satara 1999). The mean annual summer (monsoonal) rainfall at the source of the stream is 900 mm. It flows through a semi-

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arid region having a rainfall of around 750-800 mm. The early historic site of Shirwal is located on the right bank of the ephemeral stream on a gravel fill terrace 7–8 m above present bed level. The lithostratigraphy of the gravel fill terrace (from base to the top) is as follows (Table 1):

Table 1 : The lithostratigraphy, tentative age and environmental conditions (Fig. 2)

Unit No.	Litho unit	Thickness	Approximate Age	Probable climate
1	Rubble	1 m	Late Pleistocene (?)	Arid
2	Cross-bedded sandy pebbly gravel with laterite clasts	6 m	Late Pleistocene (?)	Relatively wet
3	Poorly sorted cobbly-pebbly gravel with laterite clast	1 m	Terminal Pleistocene	Semi-arid
4*	Dark brown sandy silt with pedogenic carbonate in the contact zone with Unit 3		Early Holocene	Relatively wet
		Disconformity		
5	Brownish sandy silt, non- calcereous	Late Holocene		Semi-arid

* Early Historic habitation took place after the deposition of unit 4 and before the deposition of unit 5.

The basal unit is rubble gravel, rich in sub-angular to sub-rounded blocks and boulders of amygdaloidal and brecciated basalt, and sub-rounded pebbles of compact basalt. The gravel is matrix based and deposited in a hyper concentrated debri flowing during short-lived strong floods. The gravel is 1m thick and is disconformably overlain by well-stratified sandy-pebbly gravel weakly cemented by powdery carbonate. This sandy-pebbly gravel is 6 m thick and predominated by sub-rounded to rounded litho clasts of compact basalt. A few chalcedony silica pebbles and of laterite are also present. The gravel is clast supported and well-sorted and finely laminated. The gravel seems to have been deposited in a sustained water flow condition when the stream was perennial or semi-perennial. This gravel unit is discontormably capped by cobble-pebbly gravel, poorly sorted reversely graded and clast supported. The gravel is at places capped by thin (less than 30 cm) dark brown clayey silt which is affected by vertic pedogenesis The gravel is weakly cemented by powdery carbonate and contains litho clasts of locally derived brecciated basalt, amygdaloidal basalt and also of compact basalt. A few laterite pebbles and granules along with chalcedony are also present. The gravel is deposited in short-lived sheet floods.

The entire 8 m thick exposed section of the gravel shows that the stream was ephemeral during the initial phase and became perennial to semi-perennial with relatively deeper water level and again turned shallow and short lived in the upper part. Stabilization of the gravel fill terrace has taken place sometime during the Early Holocene, in all probability definitely before 2500 B.P., as the early historic habitation has taken place on the stabilized surface.

Preliminary sedimentological studies revealed that laterite component, derived from Mandhardev hill, appears when the stream was perennial to semi-perennial, indicating major change in hydrology. It appears that lower debri flow dominated by ephemeral stage of the stream when it was draining the lower slope of the Mandhardev hill (1000 m AMSL) that is free from laterite cover. On the other hand, on the upper perennial stage, the stream has extended headward and captured the watershed of Mandhardev hill (1375 m AMSL). In spite of having larger catchment and a better drainage integrity during the later part of the hydrological history of the stream, there is again a shift towards semi-perennial to ephemeral conditions in flow regime in the terminal phase of the gravel aggradation. At present these changes in hydrological conditions of the stream can not be time bracketed due to lack of any material useful for absolute dating, though tentatively it can be placed in the late Pleistocene – when the base level of the Nira was lower than the present one (Rajaguru 1970).

Another interesting geomorphic feature observed around the site is an inset alluvial fill (2 to 4 m thick) terrace with re-deposited historical and medieval pottery scatter. This fill is composed of non-calcereous crudely laminated brownish sandy silt, inter-bedded with sand/gravel lenses.

The habitational mound at Shirwal is elongated in north-south direction (about 230 x 90 m) and part of it on the western side is damaged by the flow of stream. The habitational deposit is approximately 1-1.20 m thick and

mostly belongs to one cultural phase (Plate II: A). In the centre of the mound a few stone alignments, perhaps remains of medieval walls were seen along with scatter of small stones (Plate II: B). Two very large, rectangular stone slabs (1.2 x 1.2 m) were noticed in the centre of the mound (Plate III: A). They look like memorial stones, but it is not possible to understand their significance at this stage.

Ceramics

The pottery collected from Shirwal comprises mostly of Red ware and Grey ware with a few sherds of Black ware (Plate III: B; Plate IV: A-B). Most of the pottery is coarse and of utilitarian type. Examination of the cores revealed that the fabric is porous and with inclusions of large-sized sand particles both in Red and Grey wares. A few decorated sherds of Red ware and a spout of a jar (Fig. 3) have been found.

A total of 18 sherds of bright Red slipped ware were found (Fig. 4) of which 3 belonged to a single form of large globular pot having a high neck and thick out-turned and flaring rim (SHW 04.36 and SHW 04.58). The rim has a broad edge on its upper surface. The neck has corrugations and the slip has been applied only up to the neck on the inner side. Another variation of the neck portion is seen in case of a bright Red slipped ware sherd (SHW 04.16) that has similar but less flaring rim than those previously described sherds. Several body sherds of this type were found. These have gritty red core and these are well fired. This form is similar to one found at Ter from Satavahana Period II (Chapekar 1969); at Nevasa from 'Indo-Roman' Period V (Sankalia *et al.* 1960); and 'Late Satavahana' sherds at Brahamapuri (Sankalia and Dikshit 1952). Most of these sherds have thick and porous cores with an exception of a body sherd (SHW 04.12). The core of this pot is more compact than rest of the sherds.

A few fragments of dull Red ware (15) were found (Fig. 5) which have mainly globular pots of different sizes, lids and large cup-like bowls. Core of a small-sized bulbous globular pot (SHW 04.4) is made up of fine clay. The lip is short and out-turned and this pot has a constricted neck. This form perhaps is similar to those reported at Nevasa (Sankalia *et al.* 1960: form T82) and Brahmapuri (Sankalia and Dikshit 1952: form 37). Rim of a storage jar (SHW 04.22) indicates that this pot had provision of a lid since the rim has a lug on the flat surface to receive the lid. This form has also been reported at Nevasa Period V (Sankalia *et al.* 1960: form T102). There are a few high-necked vessels having a broad mouth (e.g., SHW 04.50). This pot in coarse Red ware is shaped like a lota. This ware also has high-necked storage jars with a provision for fitting of the lid on their rims (e.g. SHW 04.48). These storage jars are without any slip and their fabric is coarse and thin. A few fragments of lids in dull Red ware have been found (e.g., SHW 04.6). These lids have a flattish rounded top and a prominent edge above the base. A similar lid form has been noticed from both Satavahana and Late Satavahana contexts at Brahmapuri and at Ter. These lids are very coarse and the cores are extremely porous.

A special mention is necessary of a few (e.g., SHW 04.1) dull Red ware sherds that are extremely coarse and thick. These have a basal disc (diameter 4.0-6.5 cm) and flaring sides like Satavahana cups found at Karad (Anonymous 1949) and those described as 'panti bowls' found at Ter (Chapekar 1969) from Late Satavahana contexts. However, the fabric of the ones found at Shirwal is gritty and the manufacture is also very crude. These cup-like bowls with a basal disc were also found in pre-Islamic and probably Yadava period context at Pandharpur (Mate and Dhavalikar 1968-69). Thus, it is possible that the cup-like sherds found at Shirwal may belong to a period later than the rule of Satavahanas and or before the Yadavas.

The Grey ware at Shirwal is representing only wide-mouth storage jars of various sizes and shapes (e.g., SHW 04. 24 and 25). The cores are gritty and the pots are not well-fired (Fig. 6). Out of eight Grey ware sherds, one belongs to a very large (perhaps water) storage vessel (SHW 04.32) where the diameter of mouth is 62 cm. It has a plain round and thick rim. There is a groove just below the rim on the outer surface. The fabric is very gritty and the vessel is not well fired. This vessel may be of a period later than Satavahana occupation at the site.

There are two forms in Black ware: lids/jar-covers (SHW 04.38, 41,47) and cooking vessels (Fig. 6). The lids very crudely made are of very coarse sandy material. These lids are without any surface treatment. A large cooking vessel or a storage jar (SHW 04.38) is without

any slip and is made of extremely sandy clay. This jar is without any wash or surface treatment and looks very crude. Another cooking vessel (SHW 04. 26) is having a bulbous body and constricted neck. The rim is flat with a ridge for fitting of a lid. This vessel has a shinning black slip. This form has been found at Brahmapuri (Type 81).

The Red ware mostly includes cooking vessel, pots and storage jars. Most of the Red Ware fragments are devoid of slip, although in a few cases bright red slip was applied. In Grey ware most of the forms are of cooking vessels whereas one large storage jar (SHW 04.32) is present.

Bone Remains

Very few animal bones have been found at Shirwal that comprise of fragments of cattle/buffalo, sheep/goat and a bird (perhaps domestic fowl). It is not possible to further any standard archaeozoological study of these pieces because these are devoid of any distinguishing characters (Fig. 2). One fragment of a molar of horse/ass has been found in the centre of the mound that belonged to an old animal.

Molluscan shell Remains

Molluscan shell remains found at the site of Shirwal are in three forms: fragments of freshwater mussel (Lamelllidens sp.); shell waste of artefact manufacture; and shell bangles (Fig. 3, 4, 5). The surface collection made during a single random walk sampling at the site consists of 20 finished bangles of various sizes and shapes. At least three types of shell bangles are present: thin and wide; thin and narrow; and thick and narrow. Seven decorated bangles were found (Table 2, Fig. 7) of which decorations on two have been partially lost due to abrasions.

Table 2 : Measurements of shell bangles found at Shirwal (n=20)

Reg. No.	Plain/ decorated	Thickness (mm)	Width (mm)
SHW 04.61	decorated	7.7	6.35
SHW 04.62	decorated	4.58	7.25
SHW 04.63	decorated	5.73	5.92
SHW 04.64	decorated	3.78	7.17
SHW 04.65	decorated	4	5.45
SHW 04.66	decorated	5.45	11.2
SHW 04.67	decorated	5	8.9
SHW 04.68	plain	3.87	11.31
SHW 04.69	plain	4.29	8.77
SHW 04.70	plain	5	5.47
SHW 04.71	plain	3.74	7.4
SHW 04.72	plain	4.77	7.38
SHW 04.73	plain	2.72	12.47
SHW 04.74	plain	4.34	4.81
SHW 04.75	plain	5.8	6.46
SHW 04.76	plain	3.3	5.05
SHW 04.77	plain	4.46	4.86
SHW 04.78	plain	3.34	5.38
SHW 04.79	plain	3.21	4.05
SHW 04.80	plain	2.93	5.69
Mean		4.40	7.07
SD		1.18	2.36

It is interesting to note that a number of fragments of marine shells were found as waste produced during the process of artefact manufacture. This waste material includes two sawn collumellae and a sawn fragment of body whorl. One of the sawn collumellae belongs to Turbinella pyrum. However, the other waste could also be product of processing of other marine species such as Puglina buchephala and Fasciolaria trapezium.

Significance of the Discovery

The site of Shirwal is known in two historical contexts. Firstly, the caves located to the west of Shirwal were known from the turn of the 19th century. These caves are 15 in number and belong to the Hinayana sect of Buddhism. Excavation of one of the chaitya caves has been dated to the later half of the second century A.D. (Gazetteer of District Satara 1999: 890). Secondly, Shirwal was an important paragana of Adilshahi (Bahamani kingdom), and for decades a dispute over the Deshkulkarni vatan of Shirwal went on for several decades till it was settled in 1648. From the medieval records we know that Moro Trimal Pingle in 1648-49 did land assessment for revenue purpose after the Marathas captured Shirwal in 1648 (Mehendale 1996: 677-678).

The site of Shirwal described in this note is adding a new dimension to the early history of Satara district. The ceramics collected from the site during this exploration point to a habitation during the late phase of Satavahana rule in Deccan (2nd-4th centuries A.D.) Since we know that near to the township of Shirwal (about 5 km) there are caves of Hinayana Buddhism, there must have existed

an urban/semi-urban settlement of traders/ merchants. These traders/merchants who either individually or through their guild could generously give grants for such social endeavour. We tentatively suggest that the settlement found near to the modern town of Shirwal is remnant of the Early Historic trading centre that was located on a trade link from Junnar in north to Kolhapur via Karad.

During the early centuries of the Christian era there is evidence of a large trade network in western and central Maharashtra with large urban trading centres such as Ter, Paithan and Nasik. However, there seemed to be large gaps in this network as the number of sites investigated are few as compared to the vast geographical extent of the area. Now due to several explorations and excavations carried out in last couple of years in Solarpur (Joglekar and Hampe 2002; Shinde *et al.* in press), Pune (Shinde et al. 2002-2003), Beed, Jalna, Aurangabad and Ahmednagar (Anonymous 2001-2002: 41) district by scholars at the Deccan College, several small to medium-sized settlements of the early historic and medieval periods have come to light. So far only a handful of such settlements were known and therefore, one could not search finer cultural details of the early historic society such as intermediate delivery posts along a trade route, relations of small and large settlements, and so on. Emergence of new evidence like that from the site of Shirwal shows that there is ample scope to investigate the early historic Maharashtra, particularly in the southern and western regions.

Environmental background, societal adaptations to changing conditions and the socio-economic milieu are interesting from archaeological and historical point of views. However, we do not want to provide any interpretation in terms of climatic change during the late Quaternary as detailed studies on geomorphology and sedimentology are still in progress. The gravel fill terrace at Shirwal clearly shows that changes have taken place in behaviour of the stream, cutting and filling activity, temporary stabilisation of stream activity, and a change from channel aggradation to channel erosion with temporary over bank deposition. Local pools, closeness of the river Nira (more than what it is today) and overall better climatic conditions as established in other parts of Maharashtra in general (Dhavalikar 2002) might have been the favourable geo-environmental factors for selecting this site for habitation during the early historic period. In this preliminary description, the site of we wish to highlight the background fluvial morphology and to bring to forefront the potential of such sites for future geoarchaeological studies in Upland Maharashtra.

Acknowledgement

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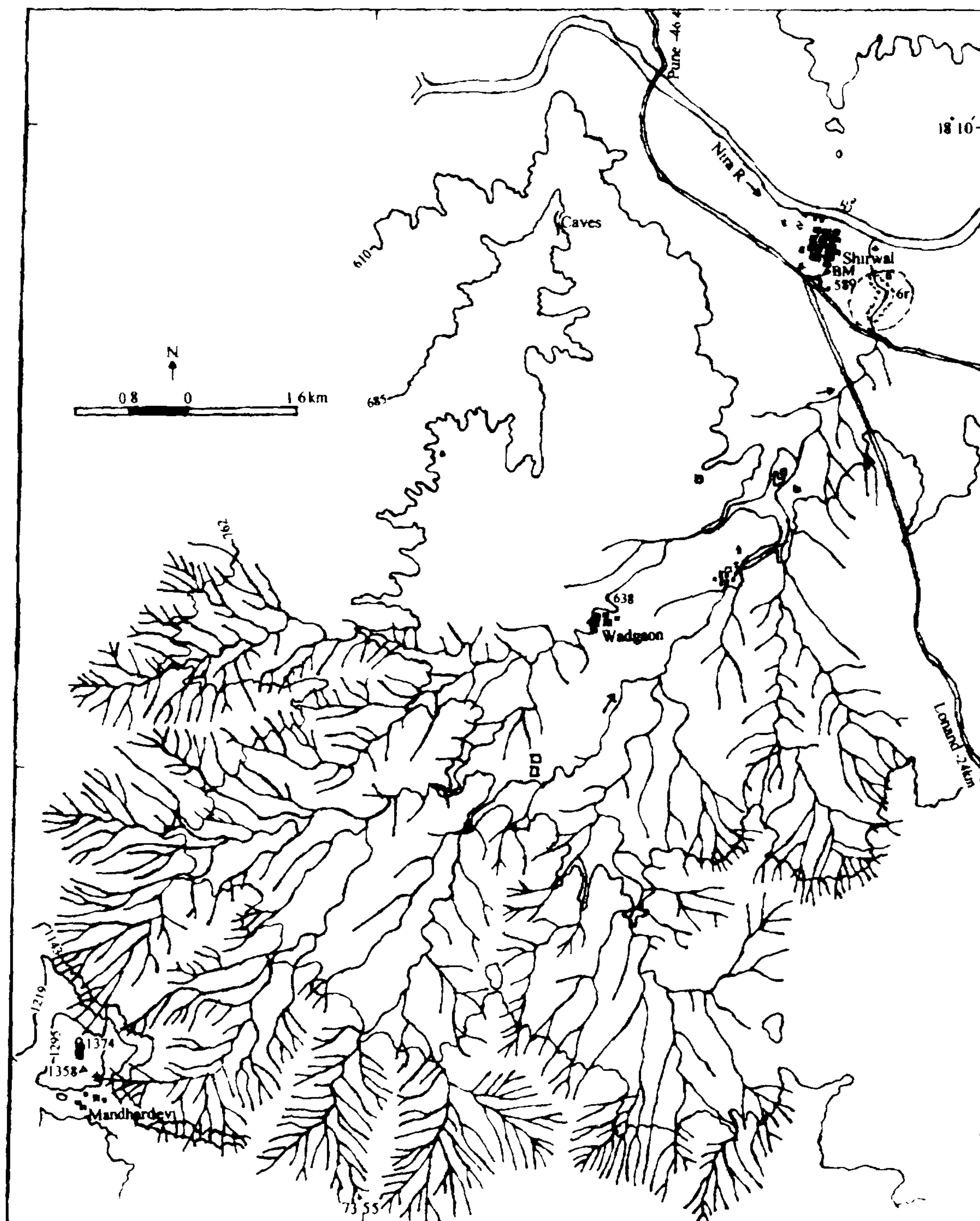


Fig. 1. Location Map of Shirwal (the site is at 6 r section)

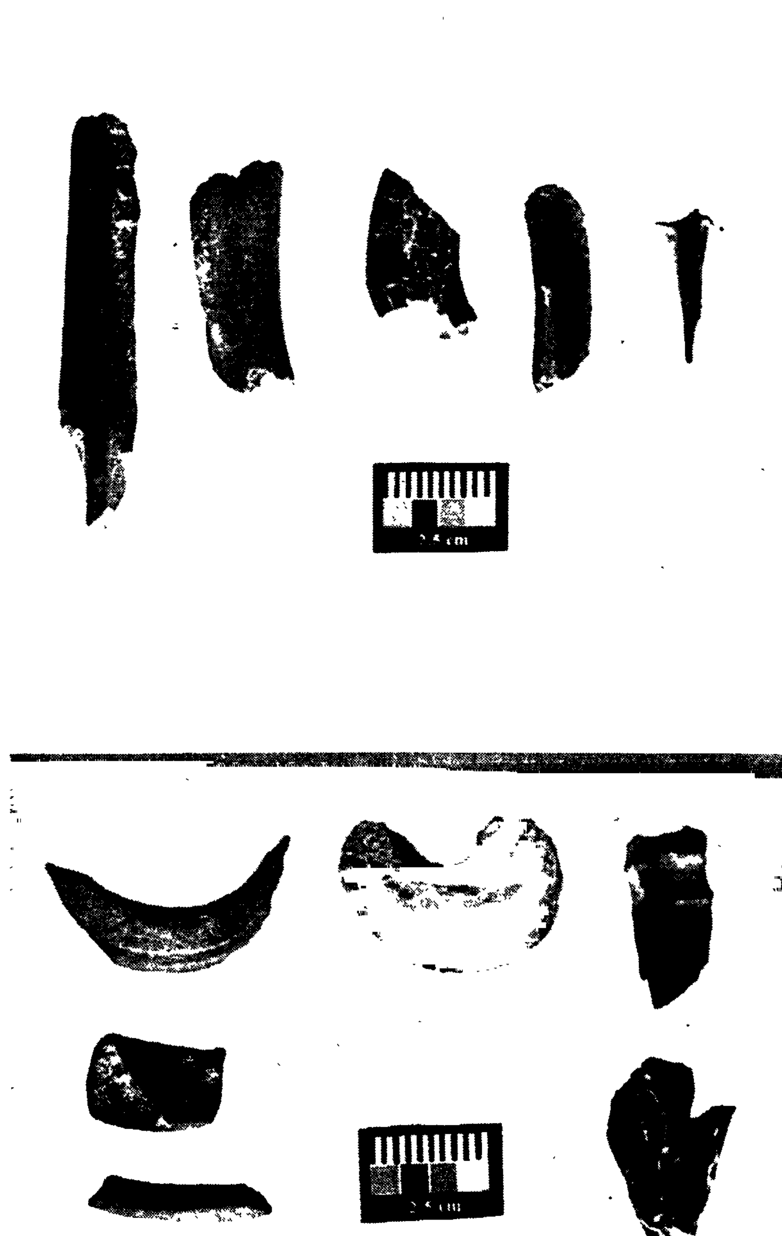


Fig. 2 and 3. Bone remains. Waste of molluscan shell object manufacture



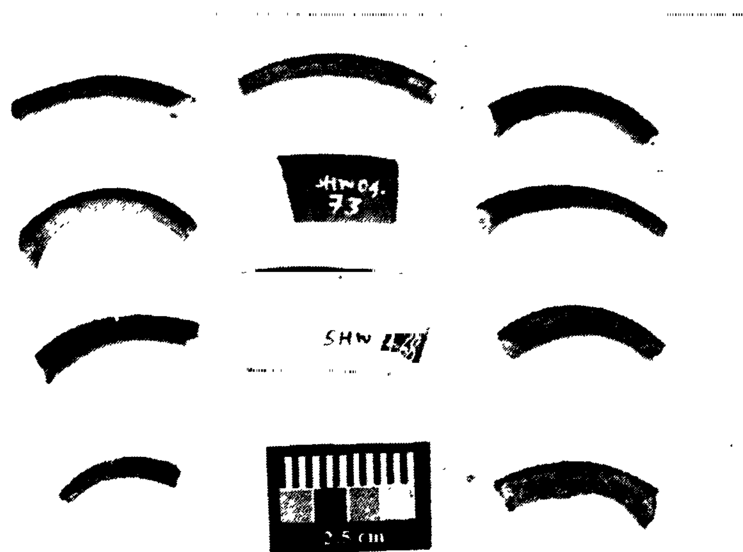


Fig. 4 and 5. Decorated molluscan shell bangles
Plain (undecorated) molluscan shell bangles

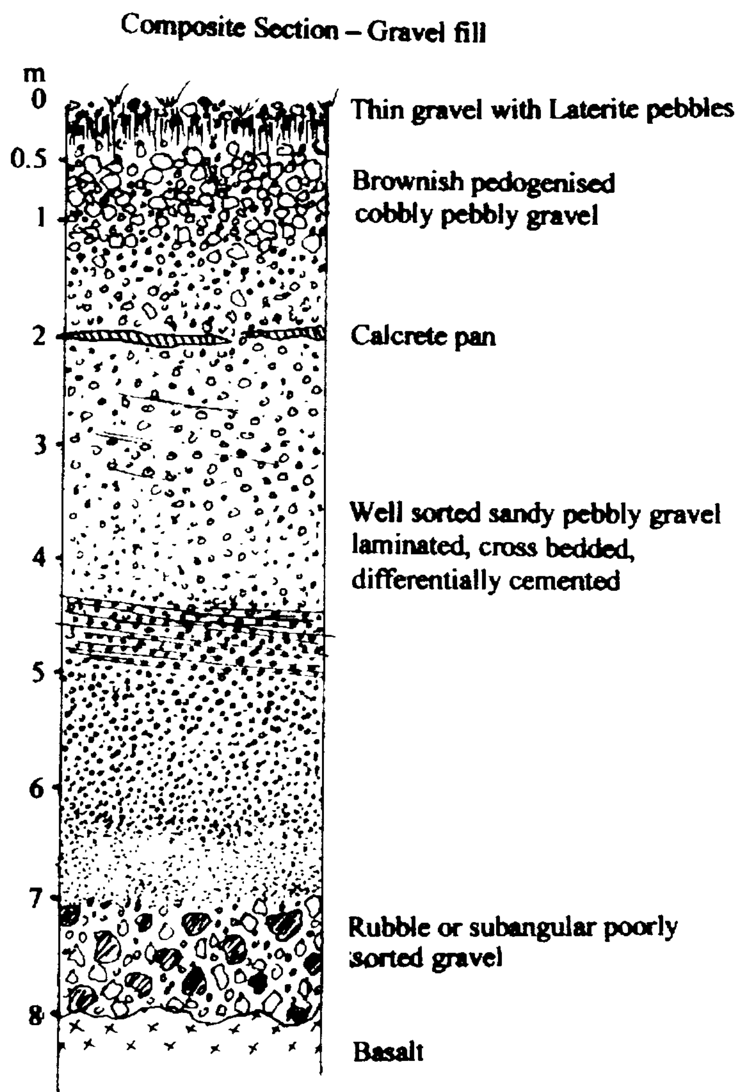


Fig. 6. Composite Section - Gravel fill

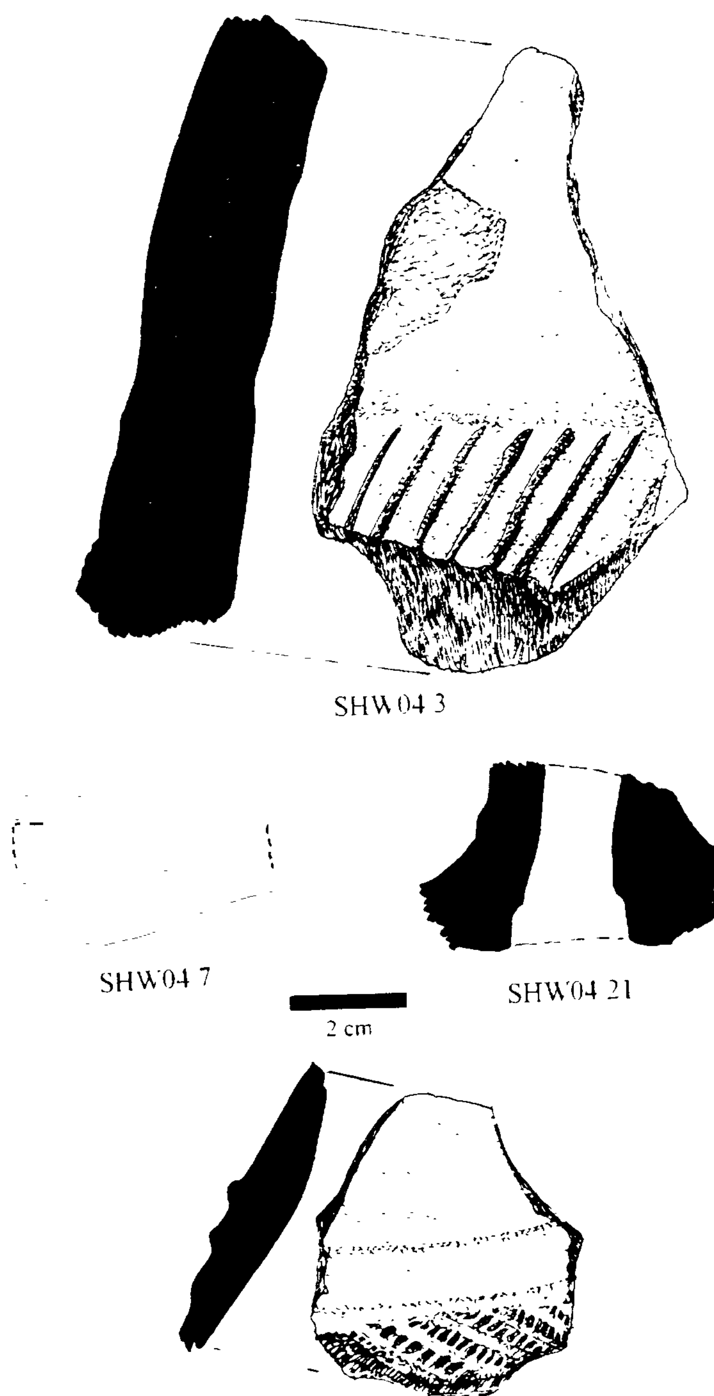


Fig. 7. Decorated sherds and spouts from Shirwal

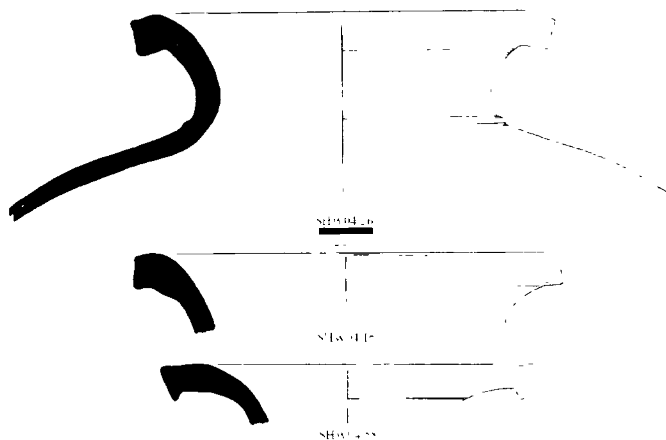


Fig. 8. Bright Red ware from Shirwal

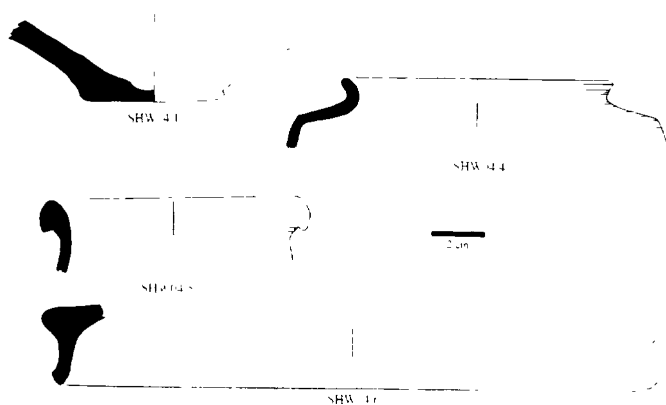


Fig. 9. Dull Red ware from Shirwal

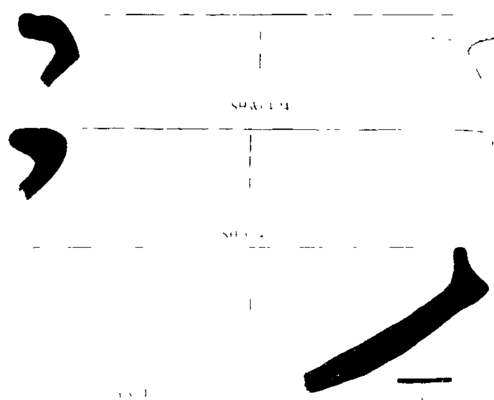


Fig. 10. Grey ware (SHW04 24) and Black ware from Shirwal

Traditional Knowledge Systems & Architecture of Uttaranchal

D.P. Agrawal* Pankaj Goyal* and Neer Prabha Negi**

The Traditional Knowledge Systems or folk sciences of Uttaranchal are very rich in all their diversity: architecture, hydraulics, ethnomedicine, ethnobotany, metallurgy, agriculture, etc. The micro-variations of the ambient harsh environment have been responsible for the excrementally rich community knowledge systems and a biodiversity necessary for sustainability of human life here. Despite the tremendous importance and value of traditional knowledge, especially in the hilly areas, such as Uttaranchal, it is on the verge of becoming extinct for various reasons. This traditional knowledge, distilled through millennia of experience and trial and error, and transmitted through the word of mouth from generation to generation, is of immense importance not only to this region but to the humanity at large. The Himalayan Medicine System has a rich repertoire of two thousand medicinal plants, and has cures for many incurable diseases in the Western Medicine System like diabetes, hypertension, infertility, alopecia, leucoderma, etc

In India we have two traditions of knowledge: The Greater or the elite Tradition (*Margi*) and the *Desi* or the Lesser Tradition which is basically the folk knowledge tradition. It is painful to note that the *Desi* Tradition is ignored by the Government and ridiculed by the West. The CSIR has started the Traditional Knowledge Digital Library (TKDL) project, which records the literary evidence of Ayurveda and other systems of medicine, but the folk tradition is just ignored.

On the other hand, the traditional knowledge systems have been a target of attack from the West, both now and in the past. Now they find it profitable to exploit the traditional knowledge systems for their commercial ends. But in the past, out of its intellectual arrogance, as also to preserve its colonial economic interests, the West either systematically uprooted or undermined the local traditional science, technology and crafts of the colonies. Western science created hegemonic categories of science/magic, technology/superstition, etc., which were both arbitrary and contrived.

India is replete with a variety of folklore and traditional knowledge systems. Perhaps they are better preserved in the isolation of the Himalayan region. These knowledge systems need to be studied, documented, preserved, and used for the benefit of humankind, before they are lost under the onslaught of Western Science

This paper thus focuses on the traditional technologies, with emphasis on architecture.

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1. Architecture
2. Woodcraft
3. Gharats
4. Copper and Iron Technology

1. ARCHITECTURE

Naulas

The folk tradition of architecture and technology is very rich in Uttaranchal. It finds expression in quake-proof houses, in *naulas*, in *gharats*, etc. The generally used slates on sloping roofs, which allowed some ventilation as also allowed the snow to slide off. The tradition required to build nests for birds. People would inhabit their houses only when the birds occupied them first. Through ingenious use of wooden beams they made the houses quake-proof. They also carved the windows and eaves with aesthetic designs. We will briefly discuss below some of the examples of traditional architecture.

Traditional water harvesting systems in Uttarakhand include a variety of community-managed systems. Their diversity arose from variations in the local conditions. Many of these systems were originally constructed by local rulers, feudal lords, or by well-to-do families in the community. They displayed a diversity of technologies and minimal state intervention in water rights or management. Their flexibility, diversity, use of local materials, skills and designs, made them compatible and relevant to the patterns of water use of hill communities over centuries. Many of these technologies are still in use, and provide for a significant proportion of the water-needs of communities in this region (Chopra, *et al.* 1993).

Naulas, also called *bawaris*, are stepped wells. *Naulas* are found mostly on the slopes of middle-Himalayan villages of Uttaranchal, particularly in Kumaun. They are designed to collect water from subterranean seepages or springs. The flow of these subterranean springs is fairly sensitive and can be disrupted seismic activity, deforestation, alterations to the structure, design of the well, or other human disturbances.

Some *naulas* are massive and intricately ornamented structures, rooms and platforms for bathing and washing clothes. Elaborate drainage systems keep the source water clean. Other structures might be just basic step wells, surrouded by trees and made of locally available materials. Usually, wells in villages are of the type, while those built by local rulers or in towns are of the former type.

Though there were no detailed rules of management, *Naulas* were distinctly community property. Villagers traditionally revered their *naulas* and the rituals observed in constructing them were similar to those of a temple construction. The water was sacred and basic rules of sanitation and hygiene were observed. Tree species considered sacred, like the peepal and banyan trees, were planted near a *naula* to protect and shade it. The *naula* water was often treated with medicinal plants such as *amla* and *neem*.

In the 13th Century Chand Rajas ruled Champawat and its surrounding areas. These Rajas took special care of the temples and the craftsmen. In those times many reservoirs, all called *Naulas* in the local dialect, were built. The Chand kings called masons, carpenters and some Muslim workers from Rajasthan, Manihar and other areas. They were provided loading facilities at Champawat, Lohaghat and surrounding areas.

Today, thousands of *naulas* lie forgotten and decaying. Their degraded condition reflects a decline in community water management and the ecology, culture and traditions that supported these systems over centuries. Ecological disruptions like deforestation, landslides, earthquakes, changing land-use patterns, increased population pressure and other factors disrupt the subterranean flows that sustain *naulas*. Where alternate sources of water have been provided, the cleanliness of *naulas* is not always ensured. Most significantly, the skill in locating sources, building and designing these structures have been forgotten. A vast majority of *naulas* are perishing under the onslaught of modern development. In Champawat, the ancient Tapnaula was buried during the construction of the Lohaghat-Barakot motor road. Similarly, several *naulas* like the Nagnaula of Dungra village in Champawat, Bhannaula, the naulas of Gangolihat block in Pithoragarh district and the *naulas* of Almora City are neglected, silted up, or paved over and lost. A wide-scale revival of community management and traditions of using these structures is crucial for their preservation. In some cases,

revival efforts have been made. Tharkot Ka Naula and the naula of Hat-Borgaon are examples of local efforts to preserve these structures (Chopra in press).

Dharas

A common source of drinking water is the *dhara*. It is essentially a drinking water fountain. Water from a spring or a subterranean source is channeled out through a carved outlet. The latter are often in the shape of either a simple pipe, figures of women with water pitchers or animal face masks. The shape of the outlet is such that even with low water pressure, water can be easily drunk. The degree of detail and ornamentation of a *dhara* varies according to the status of the builder. There are three types of *dharas*, depending on their height above the ground. If one can drink from a *dhara* while standing straight, it is called a *sirpatia dhara*. These *dharas* are sometimes decorated with face masks of animals like cows, lions, elephants, snakes or crocodiles. If one has to bend over to drink from one's hand or to fill a container to drink from the dhara, then it is called a *mudpatia dhara*. These *dharas* also have animal face masks or simple pipe structures. The third type of *dhara* is a seasonal one. During the monsoon season, wooden spouts or broad leaves are stuck in the path of a flowing spring or seepage to create them. They are called *patvinyan dharas*. Often one has to sit on the ground to drink water from them.

Many urban and rural settlements still depend on *dharas* for a secure supply of water. *Parda dhara* and *Sipahi dhara* supply water to a large population in Nainital. In Gopeshwar, a perennial *dhara* near a Shiva temple supplies water to the city. Ghunsera, Nakuleshwar (Panchdhara), Berinag, Devalthal, Chopta, Thal, Harinanda, Kantheshwar Mahadev of Pithoragarh district and Naini, Jainti and Trinetreshwar of Almora are all places with ancient *dharas*. Tharkot village, near Pithoragarh, has several old *dharas*, which still provide the village with water. These *dharas* are beautifully carved and ornamented, one example having several deities and an idol of a woman carrying an urn from which the water emerges (Chopra in press).

Pherols

The Himalayan mountain range is one of the world's most active seismic regions. According to the plate Tectonics theories, the seismic activity in this region is caused by the collision of the Indian sub-continental and the Eurasian plates. Several research studies have warned of the probability of several great earthquakes in this region, and the estimates of casualties range within the hundreds of thousands, and some even estimate casualties in the millions in more densely settled regions.

Folk technologies have evolved to cope up with such natural hazards. A defining feature of indigenous rural houses around the world 'however' is that they are non-engineered structures, constructed by native artisans who primarily use locally available materials like mud, stone, and wood. These indigenous and traditional construction practices evolved in the context of local culture, environmental constraints. Empirical housing throughout the region has a variety of adaptations and reinforcements which help in resisting damage during earthquakes. In Himachal Pradesh, timber, slate, stone, mud and bamboo are used in traditional architecture. The *kath-ki-kuni* style of housing in central Himanchal Pradesh makes highly effective use of timber beams as binding elements, and the *pherols* of Garhwal's Uttarkashi region have similar architecture. Another type of construction found in Kashmir and Himachal Pradesh is *Dhajji-diwari*, or structures with diagonal wooden bracing in the walls, which are effective in helping the building resist shear and tension during earthquakes.

The Peoples Science Institute has documented and studied the aseismic aspects of indigenous and traditional construction techniques. Rishi Das in his paper in the last Binsar Seminar had presented prominent examples of this architecture in Himachal Pradesh and Garhwal.

People used ground horse bean *(urad)* as plaster whose viscosity is considered superior to cement. Cedar, Pine, Sal, Rosewood, or Red Cedar wood was used in building houses. The doors and windows were made of wood and enriched with carvings. Sloping roofs of slate were used; the floor inside the house was made of clay with wooden base that was besmeared with cow dung every second or third day. The walls inside the house were plastered with clay while the exterior walls were done with white lime or white clay. In this manner, Bakhalis of houses (a row of houses) beautified the village.

2. WOODCRAFT

Mahila Haat (MH) conducted a study on Wood Carving in Uttaranchal to analyse the status of the woodcraft, the condition of craftspersons, and to find out ways for the revival of this dying art, etc. Wood Carving is a traditional historical heritage of the people of Uttaranchal, but now this craft is gradually disappearing. The number of craftsmen involved in this economic activity has declined considerably and there are very few left now.

Wood-carving is found in the houses of Champawat and adjoining villages, Lohaghat, the Meena Bazaar of Lohaghat and in the villages like Rajpura, Chaurimaanes, Pati, Varakot, Khilpani, Digalichaur, Khalag, Kilura, Majhera, etc. In most of the houses the woodwork is limited to designs of leaves and flowers. In many houses of village Khoona, where majority of inhabitants are from Muslim community, motifs of Hindu religion are also found apart from leaves and flowers. Serpent, dragon, Lord Hanuman, peacock, soldier sitting on a chair and fighting warriors are also carved in some houses. These pictures depict that all these must have been carved by Hindu artisans. Their imaginative motifs are simply beautiful.

During MH survey in Uttarkashi it was found that the temples were more adorned with wood-carvings than the dwellings. Besides the *wooden statues* and *masks* of goddesses, wooden litter for the goddess is a specially. The barns meant to store cereals, are also embossed with carvings.

In Chamoli District figures of Lord Hanuman, Surya or the word *Om* are engraved on the doorway of some houses. The double storied umbrella of the temple of Shri Badri Vishal is made of wood with fine carvings done on it.

Craftsmen

In Uttaranchal, almost all the village blacksmiths make carving tools and the carpenters themselves make lathes of tools and wooden hilts. All the craftsmen have inherited the skills of woodcarving from their fathers and grandfathers and later on they developed the art in accordance to their taste and interests.

Woodcarvers hold a special position among the different artisans. In the post-independence social scenario it is evident that they were ranked fourth in the caste order. Woodcarving has been done in houses, mostly belonging to wealthy families, but it was also seen in a few houses of middle class families.

Nowadays, the woodcarving demands are very limited; the number of craftsmen has decreased and their work is limited to carpentry. Bisht (2002) has suggested many measures which would revive and sustain this artistic legacy of woodcraft

3. GHARATS (watermills)

The somewhat subdued rolling sound of a continuous friction between heavy stones near the river betrays the presence of a *gharat* nearby. These *gharats* have a momentous role in utilization of mechanical power from water streams mainly for the grinding purpose.

There are three distinct types of watermills. The simplest and probably the earliest was a vertical wheel with paddles on which the force of the stream acted. Next was the horizontal wheel, with a vertical shaft attached directly to the wheel used for driving a millstone. Third was the geared mill, driven by a vertical waterwheel with a horizontal shaft. This required more knowledge and engineering skill than the first two, but it shows greater potential. Vertical waterwheels are also distinguished by the location of water contact with the wheel, as the undershot wheel, the breast wheel, the overshot wheel and the Baker wheel. These waterwheels generally use the energy of moving streams. Each type of mill has its particular advantages and disadvantages. Relatively little is known of their development before the Middle Ages (Agrawal *et al.* in press).

The Report on the Industrial Survey of the Garhwal district of the United Provinces and the *Report on the Industrial Survey of the Almora district of the United Provinces* compiled by H.N. Sapru in 1924 and 1925, respectively, as part of the general scheme of the Industrial survey of the whole province under the British regime, gives due importance to these watermills. The reports point out that there were as many as 5,000 watermills in district Almora and 2,956 watermills in the Garhwal district at the time of the compilation of the

reports.

The traditional Himalayan watermill or the *gharat* is of the vertical shaft type. The *gharats* in Uttaranchal can be found alongside the rivers. To run these mills a channel is dug along the river to carry the water up to the milhouse. The gradient of the channel for the flow of the diverted water is less than the gradient of the river. With this, after several hundred meters from the diversion, a fall of 2 to 6 meters is achieved for the water. In this manner water from the stream is tapped and routed through the chute, which then falls on the flat blades. The water chute consists of an open channel either made from wooden planks or carved from a large tree trunk. The chute is narrowed down towards the lower end forming a nozzle. The force of the water let through the chute with a head of 2 to 6 meters strikes the blades and rotates the wheel which in turn, rotates the metal shaft. The head of the water varies from place to place, depending upon the availability of the fall.

The wooden blades are fitted to a thick vertical wooden shaft, tapering at both ends. Two round millstones, hewn locally, are fitted at the top of the shaft to act as the grinding mill. The wooden shaft of the turbine is supported on a stone pivot through a steel pin and held in the sliding bearing at the top. The sliding bearing is a wooden bush fixed in the lower stationary grinding stone. The top-grinding wheel rests on the lower stone and is rotated by the turbine shaft through a straight slot coupling. The gap between the stone is adjusted by lifting the upper stone with the help of a mechanical lever. The blades vary in number in different *gharats* from 11 to 21, which is fixed lengthwise at the axis to transmit the entire load to an iron base. At opposite end from the cylindrical axis, a long shaft connects it to the upper part of the grinder stone. It is interesting to note that the fitness and quality of grain can be determined even in this nature-run process for which a groove is made into the upper grinder to set a tapered iron piece that holds the shaft and grinder simultaneously. An iron base bears the load of the system that in turn diffuses it over the horizontally laid plank. One end of the plank is attached to an adjusting lever, which moves upward and downward. The lever governs the distance between the moving and the stationary part of the grinder. An upward movement of the lever allows for coarse grinding while the downward is for fine grinding. Traditionally, channels divert the water from stream/ river to the mill. A device is also incorporated in the channel to divert the water if the water mill is not in operation. This device redirects water. It is a simple but an ingenious construction and can be maintained with simple understanding of the principles involved.

It is important to note the advantages inherent in the indigenous watermill technology, in particular:

- Simple technology
- Locally designed and built
- Involving mainly local materials
- Low capital cost
- Almost no running costs
- Easily managed and maintained
- Better taste of the ground material.

There could be as many as 60,000 *gharats* in Uttaranchal according to the study of HESCO. The Himalayan Environmental Studies and Conservation Organisation (HESCO), an Indian NGO based in Chamoli District, has also been working towards the improvement of the *gharats* in the Uttaranchal region. HESCO was responsible for setting up the Gharat Owners Association in Chamoli and has been working with them to design and implement simple upgrades for traditional *gharats*.

The *gharat* upgrade involves replacing the wooden runner with a steel casting and ball bearing. To gain another 30% of power, the open chute can be replaced with a PVC pipe and spear valve. The net result is to supply around 1KW of shaft power to the millstones. The new machine costs just the same and has an extended life span of 30% of the old machines. Additionally, the owner is saved the trouble of replacing the machine every 2 to 3 years. What is equally important is that these new machines can be serviced and repaired locally, in case the need arises. Maintenance procedures are simple and are carried out with locally available resources and expertise. The traditional wooden runner is less than 20% efficient. The design objective was to develop a runner, which can exceed 50% efficiency, but also have a geometry suitable either for casting, or low-cost welded fabrication. Furthermore, this design of runner is suitable for converting to a horizontal axis layout at a later date. The new runner is an outward flow design as the water strikes

the inside edge of the blades and escapes tangentially. The new runner is smaller and faster running than the traditional *gharat*, with speeds in the range 200-250 rpm.

There are approximately 60,000 *gharats*, each producing on the average about I.5 KW power, which can be increased up to 5 KW per *gharat* by a little extra technical input. Researchers at the Tata Energy Research Institute (TERI), Alternate Hydro Energy Centre, University of Roorkee and IT Power Limited, United Kingdom too have jointly developed a novel technique of increasing the efficiencies of these mills, sometimes by up to 1500%.

4. TRADITIONAL COPPER AND IRON SMITHY

Both iron and copper technologies have a long history in Uttaranchal. Till a few decades ago rust-free iron vessels were being produced in Lohaghat area of Kumaun. Geological surveys have shown extensive evidence of iron minerals in the region.

The iron metallurgical tradition in Kumaun is very old and part of the folklore. Like in Bihar and central India, in Kumaun also folklore attributes early iron technology to the *Asuras* (Agrawal & Kharakwal 1998). In Kumaun the folklore tradition is very strong and some of the iron smelting sites are associated with the name *Asura*, e.g., Asurchula (the hearth of the Asuras). It is also interesting to note that an old fort near Lohaghat in Pithoragarh District is attributed by the folklore to Banasur.

Near Uleni village, located about 8 km north-west of Dwarahat, on the terraces a large heap of iron slag was found. The slag at Uleni was not only found on the agricultural fields but also in a rock-shelter which was located close to the site. A charcoal sample from the site was dated by C^{14} to the early 1st Millennium BC (PRL-1648 2770+90 BP. Its calibrated date range is 1022 to 826 BC).

In the Asurchula temple (District Pithoragarh) on the peak of the hill, many iron implements like tridents, lamps, have been installed, a common practice in this area. At Agar and Ban Agar, the Agari people reside along with some Mongoloid Bhotia families. Agaris are known as the traditional iron smiths of this area. The old knowledgeable people of these villages believe that their ancestors were responsible for the aforesaid slag debris. It is also interesting that they worship Lord Siva in the form of Asura, which might have something to do with the Asuras of Central India and Bihar.

Copper smithy

In the Uttaranchal region there area a large number of small copper industries located at Almora, Bageshwar, Champavat and Pithoragarh Districts. According to the literary evidence, copper smithy was started in the 16th century AD in this region. Only the local Tamata caste did the copper smelting work in older times. These Tamatas were settled in Almora and Kharahi Patti area, because in these regions copper mines were available. In the British times, government banned the copper mining and smelting operations. But the Tamatas managed to survive by making utensils out of copper scrap by melting and beating process.

In Uttaranchal, many ancient mines are there. We surveyed Bageshwer, Kharahi patti, Tamra Nagari and Tarikhet for surveying traditional copper and ironsmiths. We got a lot of information about traditional copper work and ancient mining activities. We also went to Pithoragarh, Lohaghat and Champawat areas for surveying traditional Iron and Copper works and ancient mining activities.

Rai-Agar is 90 km from Pithoragarh. In Rai-Agar area approximately 6 villagers (Chaur maniya, Ganai Simaltha, Ghonor, Jyali, Puravi Thal and Annapurna) still have copper smithy. There are 90 to 100 Tamata families who depend upon copper smithy.

Lukhani is located about 6 km south of Lohaghat, near Karu Sarayat village in Champawat district. According to the local tradition, this was the great ancient iron mine. Here we found heaps of iron slag, blackish-brown in colour and very hard and compact.

In Almora district, 65 families are working on coppersmithy at present. They all belong to Tamata caste and are traditional copper-smiths. They stay for several generations in Tamra Nagari and Malli Bazar localities of Almora town.

The discovery of Copper Hoard type artefacts from Pithoragarh District extends the antiquity of copper smithy in this region to the 1st Millennium BC.

Tamata is the lower most caste in Uttaranchal state. Now-a-days this traditional coppersmithy is declining very rapidly because workers face lots of problems related to raw material and competition with factory made copper utensils. We think that when these old copper mines are reopened their problems will be resolved.

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Wood Based Rural Domestic Architecture of Himachal Pradesh

O. C. HANDA*

The Western Himalayan interior region of Himachal Pradesh, broadly defined as the Mid-Himalayan Region, is confined by the Outer Himalaya Range towards the south and the Mid Himalaya Range on the north. In this region, quintessential and localised type of domestic architecture, based essentially on wood, has developed in different valley areas under the valley-specific natural and human imperatives. These may be categorised as the Environmental and the ethnic factors. Among the environmental factors, geo-physiographical locale, geology of the terrain and climatic conditions are important ones. These factors influence the material aspects of and the means for the architecture. The ethnic factor may include the social, religious, cultural, economic and historical elements, which contribute to conceptualise the functional and formal characteristics of the architecture.

Topographically, this area is formed by numerous cascading and meandering streams and is composed of narrow and steep valleys and steppes running in different directions at an altitude of about 900 metres and above. Because of the ravened character, the sunny hours in the deep valleys of this region, where most of the habitable areas are located, are shorter. The higher mountain ranges around receive copious snowfall during the winter, which itself is comparatively long and severe in the deeper valleys. However, where the valleys are wider enough, as at Kullu and Rohru, the scenic grandeur of the nature may be found at its luxuriant best. This tract roughly includes the northern part of Jammu area in Jammu & Kashmir, southern part of Chamba district, Mandi, Kullu and Shimla districts and trans-Giri part of Sirmaur district in Himachal Pradesh and Jaunsar-Bawar area of Dehradun district in Uttaranchal. This area is rich in a variety of temperate forests at the lower heights, containing conifers and broad leaved trees. These forests extend from the floor of the valley to an average height of 3350 metres, succeeded by the alpine growth of oaks and conifers higher up, where the mountain slopes are richly covered with high quality *deodar* forests. These forests have provided an inexhaustible supply of quality timber for building construction. However, good structural stone, which can be dressed and chiselled into blocks, is rarely available in this region. All that is available from the stone quarries in the region is the slate schist laden with mica, which can only be sliced into the thin slates of superior quality. These slates have been the most common roof covering material in the local houses. This schist stone is however inferior for structural purpose, for neither can it be dressed or chiselled into blocks nor any type of mortar sticks to it. The only way to use it is to lay it flat one over the other in irregular coursed without any binding mortar. Therefore, the hereditary local artisans,

* Shiwalik Bhawan, Sanjauli, Shimla, 161006
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called *thawin, baddhi, raj, rajgir*, etc. have devised an ingenious way to use them for structural purposes in the domestic and religious architecture. They use these stones by combining them with wood, which has been abundantly available from the *deodar* forests. Therefore, most of the houses and temples in this region are lavishly made of wood from foundation to roof. It may be noted that it is due to the abundance of quality wood that the art of woodcarving is here highly developed and profuse.

Ethnically speaking, this region is populated by the heterogeneous amalgam of various communities. Among these, the Gujjars, the Gaddis and the Khashas are the prominent ones. Among these, the Khashas form the overwhelmingly major bulk of population. They have been a majority community of this region since the earliest times and have held their influential sway over a vast mountainous territory from Kashgar in Central Asia to Nepal in the east. The mainstay of Khasha economy has been agriculture. However, pastoral vocations, like goats and sheep breeding, cattle herding, etc. have also been the major supplementary vocation with them. While these agrarian and pastoral occupations have been responsible to influence considerably the functional and aesthetic aspects of the wood based domestic architecture of this region, the Khasha cultic belief system, based on the autochthonous deities, has reflected in their temple architecture. Since the wood based domestic and religious architecture is largely patronised by the Khasha majority and confined to the area where the Khasha population predominates, the wood based architecture of the western Himalayan region, especially of Himachal Pradesh, may reasonably be defined as the Khasha architecture

Under the constraints of the mountainous topography, most of the residential houses in this region are built in the linear formation on different terraces along the contours. Such houses normally face the valley. However, wherever large flat patches are available on the mountain spurs or in the valley, the houses in clusters may also be seen. In this mountainous interior, the orientation of the houses is regulated more by the specific local site conditions rather than by the cardinal parameters. The houses at village Osan (below Dyar) in the Kullu Valley may be cited as an example of such clustered houses. These houses are without exception double storeyed structures In some places, houses having more than two floors are also found. Such multi-storeyed houses are common in the lower Kinnaur, but are rare elsewhere in the region. While, the ground floor of these houses is used as shelter for the cattle and for fuel and fodder storage, the upper floors are generally residential. In Kinnaur, constructing multi-storeyed houses has been a usual practice, for the level plots for the houses to expand horizontally are scarce on the steep mountain profile, where most of the villages are located. In these multi-storeyed houses, the ground or the basement floor is used as byre and the first floor is reserved for storage. The upper floors, commonly surrounded by a deep overhanging verandas, are used as the living area. A flat stone slab, placed in the verandah on the hillside, which serves as a bathing platform.

Kitchen is usually on the top floor under the roof. In the middle of the kitchen, a large and sturdy slate stone is placed. Over it, a thick layer of well rammed earth, with raised edge lines, is provided. Over this cooking platform, a sturdy iron tripod is placed. The fuel wood is placed under the tripod, which holds the cooking pot over it. An escape vent is left on the roof exactly over the cooking platform for the smoke to escape. That cooking platform is not only served as a hearth but also the family members could huddle around it and keep themselves warm. In Lahul, the Christian missionaries had introduced a fuel saving portable multipurpose *chullah* Made of iron sheet, with many openings to keep many pots at the same time, it had an inbuilt smoke outlet system. This *Lahuli chullah* had become so popular among the people in Lahul that the local ironsmiths started its commercial production. That *chullah* became popular among the people of Kullu, Spiti and Kinnaur regions, but of late went out of vogue on the introduction of cooking gas.

A wide cantilevered verandah runs all through the length of the building, from which access is provided to the inner rooms. The verandah is the most used part of the house It serves for not only the different types of daytime household chores, but also the members of the family congregate, work, sit, relax and doze there. It also serves as a secure area for spreading and drying grains The verandah is generally provided with the ornamental railing panels or balusters, in between the fluted or tapered posts. Between these posts, floral cusped arches are provided Sometimes, vertical planks are fixed between the posts to cover the verandah completely To

admit air and light into the interiors, small recesses are left in the planks. The rooms behind the verandah are accessed through the small doors and are generally dimly lighted and ill ventilated by narrow ventilators to ensure that these remain well insulated against the inclement weather. In the high altitudinal parts of the Shimla and Kinnaur districts, such cantilevered and totally enclosed verandahs are provided on all sides in the upper floors to insulate the interiors from the icy winds.

In front of the house, large open space is developed for thrashing crops, winnowing grains and performing other agrarian jobs. This open area is locally called as the *khawala*, i.e., the *khalihan* The floor of *khawala* is paved with large flagstones and bounded by the parapets from all sides.

Possibly, before the technique of combining wood and stone for wall construction was developed by the artisans in the Western Himalayan interiors, all residential houses were made of wood. That fact is well established from some of the completely wood made residential houses in the interiors of Mandi, Kullu, Shimla and Kinnaur districts, and a good number of the ancient temples may also be seen totally made of wood. The Maishur Temple at Sungra in Kinnaur may be cited as an example in this regard, besides many such ones in the Outer Saraj area of Kullu district and elsewhere in the Pradesh. With the superabundance of quality timber from the coniferous *deodar* jungles and the inherited expertise to handle wood in diverse manners, the traditional artisans could hardly think of economising its use. Possibly, the over exploitation of the precious deodar jungles might have necessitated economy in the use of wood for the residential houses, but no such taboo is known to have ever existed for the construction of temples. In fact, the use of *deodar* wood for constructing a temple has not only been ordained by religion but it has also been sanctified by the age old tradition. It is for that reason that most of the native deities of the area have their own sacred groves and reserved forests. We learn from the old records that certain local rulers had imposed strict restrictions on felling of timber in their territory. The severe penalty prescribed by the ruler of Jubbal state in the Shimla Hills for felling timber may be an example in this regard. Under such compulsions, the use of stone for the construction of walls was considered as an alternative. However, the schist stone available, being of very poor structural quality, the local traditional artisans used wood and stone together to ensure uniform distribution of the superimposed load, solidity of wall and lateral stability. In this technique, wood and stone are used in different combinations depending upon the height and function of the structure. The most common of such wall types has popularly been known as the *katth-kuni*, i.e., the wall with the wooden corners.

The most common type of *katth-kuni* wall is made by laying two wooden wall-beams set apart parallel to each other longitudinally throughout the length of the wall to define its width. These wall plates are usually square or rectangular in section, with the thickness normally between 15 and 22 centimetres. In order to ensure proper bond between the two parallel wall beams, these are dovetailed or lap jointed by the cross-joists of length equal to the width of wall. The cross-joists are suitably spaced along the length of wall. Sometimes these joists are placed over the wall-beams and secured by driving wooden pegs through the holes made in them. This framework so done is known as the *cheol* in the parlance of Shimla district. In the Kullu and Mandi districts, it is known as the *chzalairi* or *patari*. The space between the wall beams is hand packed with stones laid flat. Over the *cheol*, a course of stone, meticulously 'packed' without using any mortar is laid. Such courses of stone are locally known as the *matt*. The thickness of each stone course, sandwiched between the *cheols*, is always the same as of the wooden *cheols*. This process is repeated one over the other to gain height of the wall. Similar process is repeated for the cross-walls also. However, the difference here is that the *cheol* of the cross-walls rests on the cheol of the former longitudinal wall so that these meet at right angles on the corners. Thus, the corner is always made up of the wooden sections resting one above the other, without any course of stone showing forth. That wooden corner of the wall is called as the *katha-kuni* Such wall (*katth kuni*) is known as *dorya* in Kinnaur.

When the use of wood for constructing walls is to be minimised, the walls are raised with the *cheols* widely spaced apart vertically, so that there are a number of courses of stone between the *cheols*. Usually, the high raised solid stone plinth of the tower type structure is made in this way Such wall is known as the *dhol-maide* in Kullu. The *dhol-maide* type of wall construction had been commonly adopted during the past to construct

elevated plinths of the towering castles in the Himalayan interiors, as at Gondhala in Lahul. In the Kinnaur and Shimla districts, such walls were provided to construct tall plinths of the castles at many places. Among these, the castles at Morang and Labrang are significant for their commanding locations and height. However, the most imposing among these castles is the one at Chaini in the Banjar valley of Kullu district. This towering structure of about the 17th century, popularly known as the Chaini Castle, is probably the tallest free-standing structure in the entire Western Himalayan region.

In its present condition, it is 45 metres tall. It lost its two upper storeys in the fateful Kangra earthquake in AD 1905. The restoration of the extant structure carried out by the people of the area has saved it from further damage, and it stands as a sentinel today over the whole valley in its traditional majesty and grandeur.

In Chamba and other places in the interiors, where excessive use of wood is not affordable for constructing a house, the *katth-kuni* technique has been slightly modified by replacing the square cut massive wooden wall beams with the thick wooden planks placed on edge to define the thickness of the wall. Thus, a boxlike space is formed within the plank walling. The space between the walling is then filled with the hand packed stones. This wall is called as the *farque* in Chamba. Sometimes, this technique is confined only to the erection of columns at the nodal points. The space in between is covered with the dry stone wall. Sometimes, a *dhajji* wall is also provided between the *farque* columns. To make a *dhajji* wall, framework of wooden battens, braced with the diagonal battens, is made between the columns. The space within the wooden framework is then filled with hand packed chips of stone and mud mortar and finished with mud plaster. This technique is only used for making the residential houses. I have never seen such type of wall being constructed for the temples, with the exception of some wooden temples in the Pangi valley of the Chamba district. Such walls are undoubtedly laterally much fragile and short lived. The *farque* type of walls had been common in Brahmaur and Chamba areas of Himachal Pradesh and in the Kashmir Valley in the past, and many old houses built in that manner may still be seen there but this type of wall construction fell out of vogue in the new constructions. Nevertheless, during my field studies I saw houses being built with the farque type of walls in the upper Tons valley beyond Mori in the Uttarkashi district of Uttaranchal.

The technique to fabricate the types of wall noted above, i.e., the *katth-kuni*, *dhol-maide* and the *farque*, might have been developed at the earliest in about the fourteenth century in Himachal Pradesh, when various cultural factors entered this region from the neighbouring Kashmir. The sturdy wood-n-stone construction of these houses ensured protection from plunder and pillage. Prior to that period, the wooden structures were made all of wood, with walls made of planks fitted in the wooden framework. It is significant that in the wooden temples of earlier period, even the thick forewall of the sanctum is made of the wooden logs laid horizontally or vertically as in the case of Maishur temple at Sungra or in the wooden temples of the outer Saraj area in Kullu.

Coming to the roofing arrangements, the wood workers of this region did not have any idea of fabricating trusses, struts and diagonals to secure lateral rigidity in the fabrication of roofing sub structure. They employed the age old method of supporting the roof rafters either on the wooden pillars or posts or on the walls. The same age-old method has continued even to day in the residential houses and the wooden temples. The roof is projected considerably beyond the supports to protect the wooden exterior of the building from the direct effect of sun and rain. The window openings, balustrades and other exposed structural parts are carved meticulously and elaborately.

Traditionally, wooden planks were used as the roof covering material in the region. We still have many traditional houses in the interiors, which are wooden from bottom to top. For instance, all old houses in village Kafaur, the first village of Kinnaur district, are covered with wooden planks. So has been the village of Lakkar Mandi in Chamba district, where most of the traditional houses are wooden from the bottom to top. However, the people, having realised the impermanent nature of wood under the prolonged exposure to the elements, discovered imperishable roof-covering material which is the slate, obtained from the schist rocks.

The gables of the traditional sloping roofs of the houses are not straight, but these have one or more angles on it along the horizontal axis that effect flatness on the

lower portions towards the eaves and steepness towards the ridge. The number of angles may depend upon the rows of planks or slates that form the profile of the roof. The upper edge of the planks or slates in each row is raised slightly so that the profile of the roof attains gradual upward steepness, giving an effect of a curvaceous swing to the roof. Apart from giving a pleasing look, this innovation also has a functional advantage. It ensures that the ceiling is provided uniformly at one level, and so the windows can be placed properly and duly protected by the roof projections. Of late, galvanised iron sheets have been gaining favour with the people.

Openings, which serve as the windows, when they occur in the lower portion of the traditional dwellings, are always small, being no larger than a man's head. The doors, with the elevated sills, open into the sunken rooms. These are normally very small. One has to bend a little at the door to get into the room. This is also customarily regarded desirable as a token of respect to the *griha-devta* In fact, the door is held sanctimonious, and it is usual to find an image of a deity carved on the top part of the doorframe. At times *mauli* (untwisted cotton thread, dyed red or red and-yellow) and other votive objects, which have been ritually treated to ward off evil eyes, are also tied on that part so that on may pass under them after getting "sanitized".

The regular stairs have been a rarity in the traditional wooden houses. One has to step up on a portable notched ladder, locally called as the *phainte*, to reach the upper floors through the trap doors. These ladders are made of the one piece thick and sturdy logs on which notches have been cut. During the night and in case of danger, the ladder is dragged in and, thus, the house is secured.

The present day domestic wood-based architecture of Himachal Pradesh has evolved through the course of centuries. It caters not only to the functional necessities of the people, but also reflects their religious and aesthetic moods. It has evolved organically from the soil and it completely harmonises itself with the Himalayan ambience. It may be hard to find a traditional dwelling in the region that may appear out of place in the overall natural setting. Against that, the tall modern concrete structures look as the flagrant intrusion in the serene Himalayan landscape.

Typology of Wooden Temples of Uttaranchal

MADHU JAIN*

In Uttaranchal, the wooden temples are largely confined to the mountainous region west of the Yamuna. Most of them are located in the highly rugged and mountainous region of the Uttarkashi district between the Tons and the Yamuna. Among these, worthy of note are the Kapil Muni Temple at village Gundiyat Gaon, Nag Devta Temple at Kupera, Shani Devta Temples at Kharshali, Karna Temple at Deorah, Pokhu Devta Temple at Naitwar and Duryodhana Temple at Saur. There are also a few wooden temples in the interiors of Dehradun district in Jaunsar-Bawar *paragana*, but those generally appear more as the residential houses than the temples. Nevertheless, we could discover one interesting wooden temple at village Jadi in Jaunsar.

Gundiyat Gaon, Kupera and Kharshali are predominantly the ancient Brahman village on the old pedestrian route to Yamunotri along the upstream course of the Yamuna. Gundiyat Gaon was once the chief residence of Pritam Shah, one of the brothers of Pradumn Shah, the king of Garhwal. Kharshali is a large Brahman village in the head reaches of the Yamuna gorge on the ancient footpath to Yamunotri. There are two ancient wooden temples in this village, which have lately been dedicated to Shani Maharaj. The Brahmans, who outsmarted the native Khasha people in the region, planted the Brahmanic identiy upon the autochthonous Naga deities.

Naitwar, Deorah and Saur villages are situated in the upper reaches of the Tons and further upstream in the Shupin gorge. There also stands a newly built beautiful miniature temple of Bhairav at village Shankri. At Naitwar, there exists a wooden temple dedicated to Pokhu Devata. To reach the temple, one has to go down a steep and rocky path to the confluence and across the Shupin River to reach the angel, where the temple stands on a terrace. At Deorah stands the temple of Karna on an elevated terrace. This village is located on the flat slope of a mountain range on the left bank of Tons. To reach the village, one has to trek a two kilometer-long ascending and marshy bridal path from Naitwar. Saur is at the tail end of the motorable road in the Shupin valley, fourteen kilometers away from Naitwar. Shankri is located at a distance of twelve kilometers from Naitwar on the same road. A bridal path leads from Saur to the picturesque village of Har-ki-Doon, where another interesting wooden temple, identical to the one at Saur, is situated.

Handa in his pioneering research work *Wooden Temple Architecture of the Western Himalaya* (2001) had identified temples of that region into seven categories on their elevational characteristics and roof-forms. These are as follows :

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1. Gable-roofed Temple : A single storey temple built on the solid stone plinth with the gable roof. Such temples are common in some parts of Himachal Pradesh, but not found in Uttaranchal.

2. Composite-roofed Temple : A single storey temple built on the squat stone plinth with a pent or pent-n-gable composite roof.

3. Tower Temple: It is a multi-storey tower type temple with a pent or composite pent-n-gable roof.

4. Multi-tiered Pyramidal Temple : A single storey temple with multi-tiered pyramidal roof, normally capped with a conical canopy.

5. Canopied Composite-roofed Temple: A single storey, oblong temple standing over the wooden framework on the plinth, having a pent or pent-n-gable 'composite' roofing, with an independent roof surmounted by a canopy over the sanctum.

6. Circular roofed Temple : Although, such type is rare, yet he has identified one such temple in the interiors of Shimla hills.

7. Composite Temple : In this category, such classical stone temples, which after the later medieval periods were provided with protective wooden superstructure, have been included. There are significant number of such temples in a wide area in the interiors of this region. In fact, most of the classical stone temples in Uttaranchal have wooden canopies, fitted lately on them.

Besides, there are many such sanctuaries, not temples in the strict sense of term, in the Jaunsar-Bawar *Paragana* of Dehradun district, which look more like the secular buildings than the sacred. These are generally made of rubble stone masonry laid in mud or the bricks and roofed with the slates or CGI sheets. The temples of Botha Mahasu at Lakhwar and Basoi in the Jaunsar-Bawar area are the examples in this regard. Both these structures with fronting verandas and rooms on the back, look more like the double storeyed residential houses than the temples. A room is apportioned to the deity in these houses, where his image is installed in a portable altar in one corner. This concept of 'House Temple' is seen taking roots at Mathura, Ayodhya, etc.

As a rule, all the wooden temples in Uttarakhand follow the architectural style that Handa has defined as the Tower Temple, Canopied Composite-roofed Temple and Composite Temple. However, most of the wooden temples of this region are the Canopied Composite-roofed Temples. In Uttaranchal, this architectural style is characterized by a single storey oblong temple structure standing on the plinth over a wooden framework, having a pent or pent-and-gable 'composite' roofing, with an independent roof surmounted by a canopy over the sanctum. Traditionally speaking, the structure of the 'Canopied Composite-roofed' temple is not found on the ground, unlike the usual practice of construction, but the superstructure of such temple is raised on the massive *deodar* beams placed on an elevated masonry platform. Normally these beams extend beyond the edge-line of the platform on the corners. The superstructure so raised is extensively wood-based, with massive pillars, wall-panels, roofing, etc. Even the covering over the roof is of the wooden planks. According to the tradition, a temple should always be made of the Himalayan *deodar* wood. The wood used for making some vital structural parts, the ridgepole and the door for instance, should necessarily be of the *deodar* tree that has been approved by the deity. In fact, *deodar* is traditionally regarded 'the wood of the gods', that is, *dev* + *dar* (or daru). In 'Canopied Composite-roofed' temples, material other than the deodar wood has hardly been used. However, of late, the use of timber has considerably declined owing to various statutory restrictions and reconstruction of the old wooden structures of temples. Stringent restrictions of felling of trees, even in the forests owned by the temples under the age-old customary laws, have reduced the use of timber in the temple construction. The rebuilt stone structure of the Pokhu Devata Temple at Naitwar and the newly built Mahasu Temple at Jadi are the examples of this changing trend.

A wooden temple generally has an open *mandapa*. In fact, all 'canopied composite-roofed' temples were originally planned with the open *mandapas*. Lately, most of the mandapas have been enclosed with the walls made of stones or the wooden planks on security consideration. None of the wooden temples in the Tons gorge now has an open *mandapa*, although all of them earlier had open mandaps, with wooden pillars on the outer edges, which

supported the roof. The old structural parts, pillars, etc., of the open *mandapas* of those temples may still be seen embedded in the lately built stone four-walls. Some of them also have the *pradakshinā-path* around the *sanctum sanctorum* or *garbhagriha*. Thus, the original oblong layout of the wooden temples of this type may be found conforming to the classical parameters of the north Indian stone temple architecture. The roof over the *mandapa* and over the *pradakshina-path*, if provided, is of the pent or the composite pent-n-gable type, but a graceful multi-tiered conical roof, surmounted by a *kalasha*, is necessary over the *garbhagriha*.

The canopied composite-roofed wooden temples are generally found at such hallowed sites in the Himalayan interiors, where in the unknown past, classical stone temples existed. The structural fragments and broken images of those stone temples may be found littered around the standing wooden temples at such sites. At many places, the wooden temples. In certain cases, structural elements of the extinct stone temples may be found fitted into them and the stray ancient images placed in the temple beside the principal idol (or face-image). Apparently, at least some parts of the substructures of the standing wooden temples of Karna at Deorah and Kapil Muni at Gundiat Goan may be the extant evidences of the extinct stone temples that stood there in the past. The structural fragments and dismembered stone images of those stone temples may be found scattered around the temple sites or haphazardly fixed in the boundary walls or placed loosely in the standing wooden temples. The conscientious local people have religiously been assembling some of such structural fragments to improvise miniature temples at many places. The Mahasu Devata Temple at Hanol and the Karna Temple at Deorah may be the good examples of that endeavour. At Hanol, even the residual part of the classical stone structure of the sanctum has been capped by the towering multi-tiered wooden structure. At Gundiyat Gaon, the people have collected some of the ancient stone images in an improvised concrete enclosure close to the standing Kapil Muni Temple. The circumstances that led to the construction and destruction of those classical stone temples and their replacement with the wooden ones may call for thorough investigation.

From the residual evidences of the ancient stone temples, it becomes evident that many of them belonged to the period between the eighth and twelfth centuries. That was the time, when the stone temple architecture of the post-Gupta renaissance under the Palas, Gurjaras and Pratiharas was introduced in the Himalayan interiors by the local rulers, the *shreshthis* (nobles) and the *dhaniks* (wealthy merchants). The temple building enterprise by the non-indigenous influential class in the Himalayan interiors on the trade and pilgrimage routes had telling psychological effect on the native Khasha population. Not only they thought of establishing their gods among their midst in the villages, but also adopted many deities, particularly Shiva, into their fold.

The reason for the destruction of the ancient classical stone temples in these areas may not be precisely known. In fact, barring a standing stone temple of Bhagawati at Lakhamandal on the west bank of Yamuna, no other standing stone temple of that period exists in the western part of Uttaranchal in Garhwal, where now wooden temples are found It appears that after the collapse of central power in the Indian mainland, the patronage and expertise that had been vital for construction and survival of the stone temples may have ceased to exist. The artisans of mainland, although expert stone-workers, were probably not aware of the unsuitability of the schist stone available in the Himalayan interiors for structural purpose. Obviously, the stone temples built of such a poor quality stone, without using metal clamps or mortar, started crumbling and breaking down for want of maintenance. Therefore, when it came to re-creating the vanished stone temples, the local hereditary artisans, who excelled in the woodwork, found wood to be the handiest and convenient structural material. Those artisans could recreate the ancient sacred structures in timber, replicating the layout parameters of the anterior classical stone temples. It was, however, not practicable to recreate the ruined stone structures in timber in letter and spirit, adherence to 'letter' was abandoned and the element of 'spirit' of the classical mannerism fully retained. The result was the newer and indigenous version of the classical stone temple architecture rendered in wood. The *mandapa* and *antarala* parts were erected with pent or composite pent-n-gable roof conforming to the roofing pattern the traditional secular buildings, but the roof over the celestial realm, the *garbhagriha* was innovatively made loftier to replicate the stone *shikhara* by laying it independently in the multi-tiered conical form

Since many temples were raised on the existing stone sub-structures, the super-structures of the new wooden temples were erected on the sturdy framework of the wooden beams on the existing plinth. These beams may be seen extended beyond the edges of the old substructures on the corners to secure firm lap joints, as in the Karna Temple at Deorah. In the course of time, that became a standard method of erecting temples. The superstructure of the celestial realm - the *garbhagriha* - however was built independently in the traditional technique of constructing timber-bonded stone walls or those were made totally of timber. Of late, under the local prevailing conditions in the Tons valley, stone walls generally enclose the sanctum.

A few of the classical stone temples, which escaped serious damage to their structures, were enclosed in the wooden shell. A temple of Dundi Devi at Dhabas in neighbouring Himachal Pradesh is good example of such improvisation. The damaged classical *Shikhara* of the Mahasu Devata Temple at Hanol was replaced with an elaborate multi-tiered wooden superstructure over the Jangha. In such temples, the standing *mulaprasada* structure of the ancient classical stone temple and the later wooden structural contraption may be found integrated together. Handa has called such temples as the 'Composite Type'. Such structure is neither of the stones nor of the wood in a strict sense, but a harmonious blend of the two. In such arrangement, the classical and the folk structural components combine to formalize an imposing structure. The Mahasu Devata Temple at Hanol and the Bhagwati Temple at Lalkhamandal are the two good examples of this type.

To protect the super-structures of some of the popular ancient classical stone temples against seepage of water through the fissures caused by weathering, they have been provided with the superficial canopy over the *shikhara* Such protective wooden covers do not infringe upon the original character of the classical structure most of the standing stone temples of the early period in the mid-Himalayan belt from Chamba in Himachal Pradesh to Jageshwar in Kumaon are therefore found fitted with the protective wooden canopy.

It may be of interest to review briefly the architecture of three wooden temples, one from each category, i.e., the 'Canopied Composite-roofed' temple at Deorah and the 'Composite Type' temple of Mahasu Devata at Hanol. There also exists a Tower Type temple at village Kharshali. It is probably a singular example of the Tower Type in Uttaranchal.

'Canopied Composite-roofed' temples at Deorah:

The Karna Temple at Deorah in the upper Tones gorge may be one of the oldest specimen of the canopied composite-roofed type. The antiquity of this temple-site is attested by the piles of structural elements of stone temples that stood here in the past, some of which have been arranged into solid spires to suggest mini temples. The earlier stone temple was most likely dedicated to Shiva as may be assumed from the *yoni-pithas* and a massive couchant bull in front of the present temple.

This temple is laid out on a rectangular solid plinth, almost a metre high. On it, massive deodar wooden beams, lap-jointed at the nodal points, are placed to take and transmit the superimposed load uniformly downwards. The outer walls of the temple are made of the coarse rubble stones, interspersed by the *deodar* wood wall plates. The area within the outer walls is divided into three functional parts, having a distinct level difference, the *mandapa* being at the lowest and the *sanctum* at the highest level. A circumambulatory passage runs around the sanctum. Two small ventilators on the sidewalls admit some light into the other dark and narrow passage.

The 'U' shaped verandah in the forepart of the temple is provided with high railing between the wooden posts. The four-element recessed doorframe and the double shutters of the door are of the gilded brass sheet, embellished with very crude and linear figural forms, whorls, herringbone patterns, etc., by repousse work. Similar ornamentation may be noted on the wooden pillars and the door of the *garbha-griha*. On the lintels and stiles of the doors, coins of various denominations are nailed.

The *mandapa* and the verandah are covered with the gable roof of wooden planks The sanctum and ambulatory are roofed independently. This roof has a fronting gable that overlaps the roof over the *mandapa* On the back, it is in a two-tiered pent type, with a small vertical clearance between the tiers. Over this pent-roof, a sharp-pitched conical roof, suggestive of a canopy, is

erected. A small inverted funnel-like canopy supersedes it. The canopies are covered with the PGI (plain galvanized iron) sheets. A multi-element conical Kalasha is installed on the top. The roof-ends are treated with turned wooden fringes and bells. The whole temple structure gives a very imposing and nostalgic look

'Composite Type' temple of Mahasu Devata at Hanol

The Mahasu Devta at Hanol is a very prosperous establishment and for that reason, repair, modification and expansion are the continual activities at this temple. Obviously, although a profusely decorated edifice, with intricate and tasteful woodcarvings on almost every inch of its structural creation, except for the gilded and chased inner votive door. Nevertheless, the stone *mulaprasada* on the extreme back of the structure, which forms the sanctum for the temple, is far more ancient than the wooden contraption on its top and the other apartments. These later wooden additions in front of the classical stone cella include a *bhandar*, an *antaral*, a *sabha-mandapa* and the *mukha-mandapa* (frontal portico), all laid out in a linear formation.

Several classical features of stone structure fully attested its antiquity The repetitive use of angular and cushion moulding at the plinth (*adhisthana*) and the raiser (*kati-bandhana*) levels of the *mulaprasada* would make it coeval with the intact Shiva Temple at Hatkoti. These and many other features of the Pratihara architecture reflected on these temples may assign to them a period of about AD ninth-tenth century The ruined ancient structures clearly indicate the existence of a large building-complex at this site anterior to the standing temple. The discordant position of the standing stone temple against the layout pattern of the damaged complex may also reveal that this temple did not form part of that earlier complex. Possibly, the stone temple was built on the spoils of the anterior structures. That possibility is also suggested by the existence of incongruous decorative elements on the outer surface of the standing stone temple-structure.

In front of the sanctum is a large room, called *bhandar* It functions as an extension to the sanctum. In it, sacramental objects are stored The sanctum and the *bhandara* are pitch-dark.

Entry to the *bhandara* is restricted only to the *pujaris*. In front of the *bhandara* is a vestibule or an *antarala* On the left side of this room is a small door, exclusively meant for use by the *pujaris* The devotees are supposed to perform obeisance to the deity at the massive gilded door that opens into the bhandar from this room. This door remains closed, except when the *pujari* enters the sanctum to perform the daily *puja*. No one is supposed to be present at that time in the vestibule. Therefore, the most privileged one can have a fleeting *darshana* of the *bhandara* only. As soon as the *pujari* enters the *bhandara*, the gilded door behind him is closed and only then, the door of the sanctum is opened. The gilded door of the *bhandara* is very interesting. Its surface is profusely embossed with human and animal figures executed in a very bold manner. These pictures depict the episodes associated with the birth of Mahasus. The doorframe is intensively covered with the coins nailed one over the other through the years, but none of them is of numismatic interest. That may also suggest that the door and its frame are not very old. In front of the vestibule is the *sabha-mandapa*, followed by an open frontal portico.

All the four apartments are roofed separately in an elaborate manner. The most pompous and magnificent multi-tiered and canopied roof is fitted over the existing age-old classical stone structure of the sanctum. The *bhandara* and vestibule have a combined three tiered pent-roof with a pyramidal canopy. The *sabha-mandapa* is covered with the twisted wooden brackets and other decorative devices. The frontal porch has a gable roof over it supported by two wooden pillars, with an intermediate complex ornamental arch. The entire woodwork is carved profusely and tastefully. The main door leading to the *sabha-mandapa* is of particular interest. All this ornamentation is only a couple of decades old. Ganga Ram, who belongs to a family of the traditional wood-carvers of Uttarkashi, executed these carvings.

Shani Devata Temples at Kharshali

Set amidst the lofty mountain ranges, there are two ancient wooden temples at village Kharshali, located at the confluence of the Yamuna and the Hanumanganga near Yamunotri. Although both of these temples have been built in the local diction, yet each of these represent

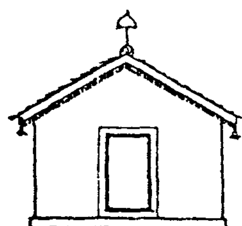
different architectural and functional types. The tall tower-like structure that presently enshrines the deity may be an improvisation than a regular temple, because there is structurally nothing temple-like in it. The other is a single storey canopied composite-roofed. Both these temples have been dedicated to Shani Maharaj.

The tower-like Shani Devata temple that exudes naive gravity and boldness befitting a defensive citadel, is about fifteen metres tall structure. Its bottom is three metres deep form the solid rubble stone plinth. Over this raised plinth, there are four floors, each three metres high. It is said that it originally had fifteen storeys. The walls above the plinth are made of the timber-bonded rubble stones. The whole building is provided with a low-pitched gabled roof, covered with thick slates. The whole building is grievously tilted backward, with the masonry joints, particularly at the corners, badly sheared. The pernicious effect of weathering through centuries is writ large on each stone of the structure. In order to protect the structure from disintegration, the ingenious people have braced the outer walls with vertical wooden poles on their both, inner and outer faces. Each pair, comprising two poles, one on the external and the other on the inner faces of the wall confronting each other, is securely fastened together with the horizontal joints passing through the thickness of wall at intervals so that a tight grip of the wooden contraption in ensured. How far these logs will hold the massive structure is anybody guess, but the incessant process of tilting is very much evident from the tell-tale warping deformity on the vertical logs.

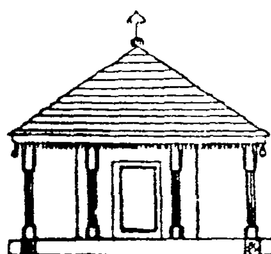
The ground floor of the tower is entered through a projected landing. This landing platform, covered with a gabled slate roof, is connected by an external flight of steps. This projected landing and the steps are certainly much later additions. Earlier, a stepladder (locally called *phainte*) similar to the ones inside the building existed here also. That ladder could be placed in position and pulled inside as the situation warranted under the medieval conditions.

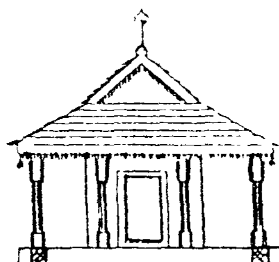
A wide passage running from end to end exists on the ground floor. A small window on the opposite end admits dim light in the interior. There are four rooms of equal size, two on each side of this passage. This arrangement is repeated on all the upper floors. From the ground floor, one has to ascend through a series of one-piece *deodar* wood stepladders and trap doors to the succeeding floors. All the floors of the tower-temple are badly tilted. These are dark and dingy, except for the small peepholes, which served for surveillance. These admit occasional beams of sunrays into the rooms.

On the top-most floor, placed against an inner wall of the room on the south-eastern corner, the face-images of Shani Devata are enshrined on a wooden altar. These so-called images of Shani Maharaj had originally the images of the Naga deities. There is an inscription on the wall beside the outer flight of steps. This inscription, possibly not of the date earlier than the eighteenth century, is too weathered to be read meaningfully.

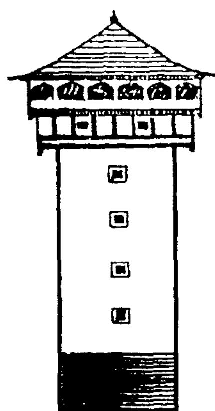


Gable-roofed Temple

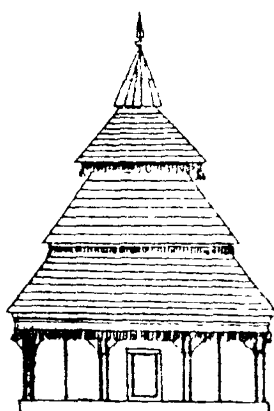




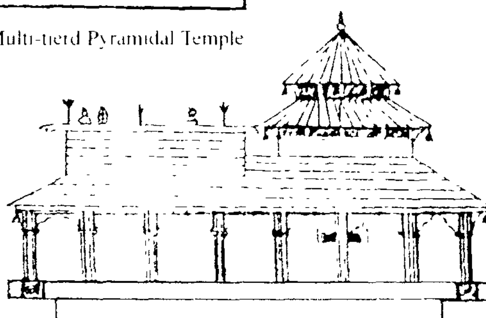
Composite-roofed Temple



Tower Temple



Multi-tierd Pyramidal Temple



Canopied Composite-roofed Temple

Fig. 1. Typology of Wooden Temples in Uttarakhand

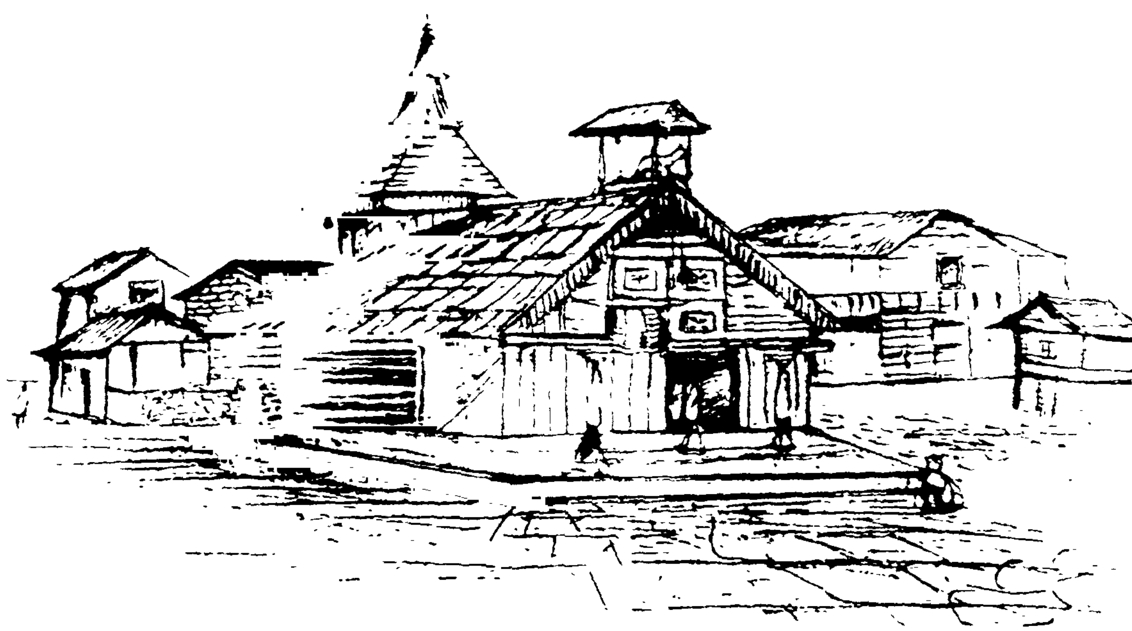


Fig 2. Shani Devta Temple at Kharshali

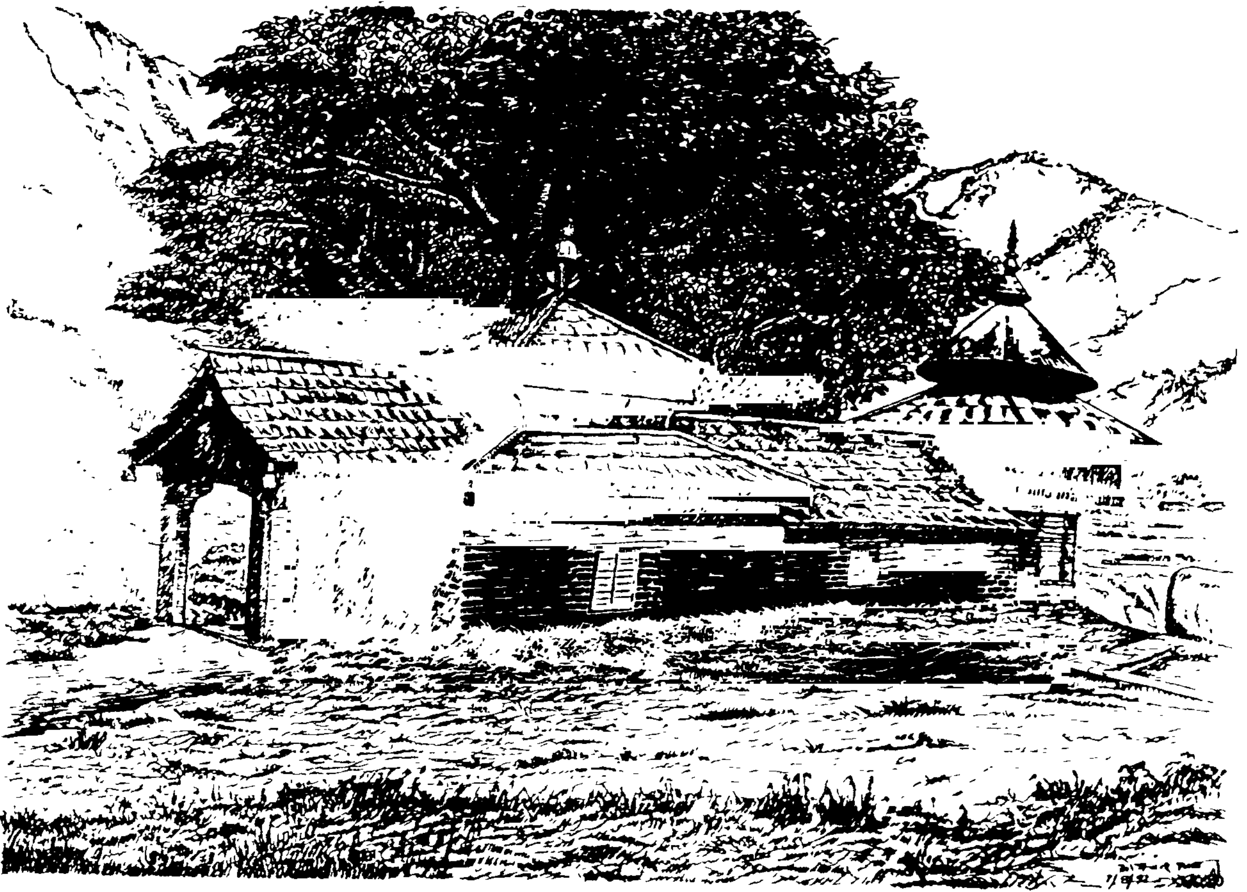


Fig 3. Mahasu Devta Temple at Hanol

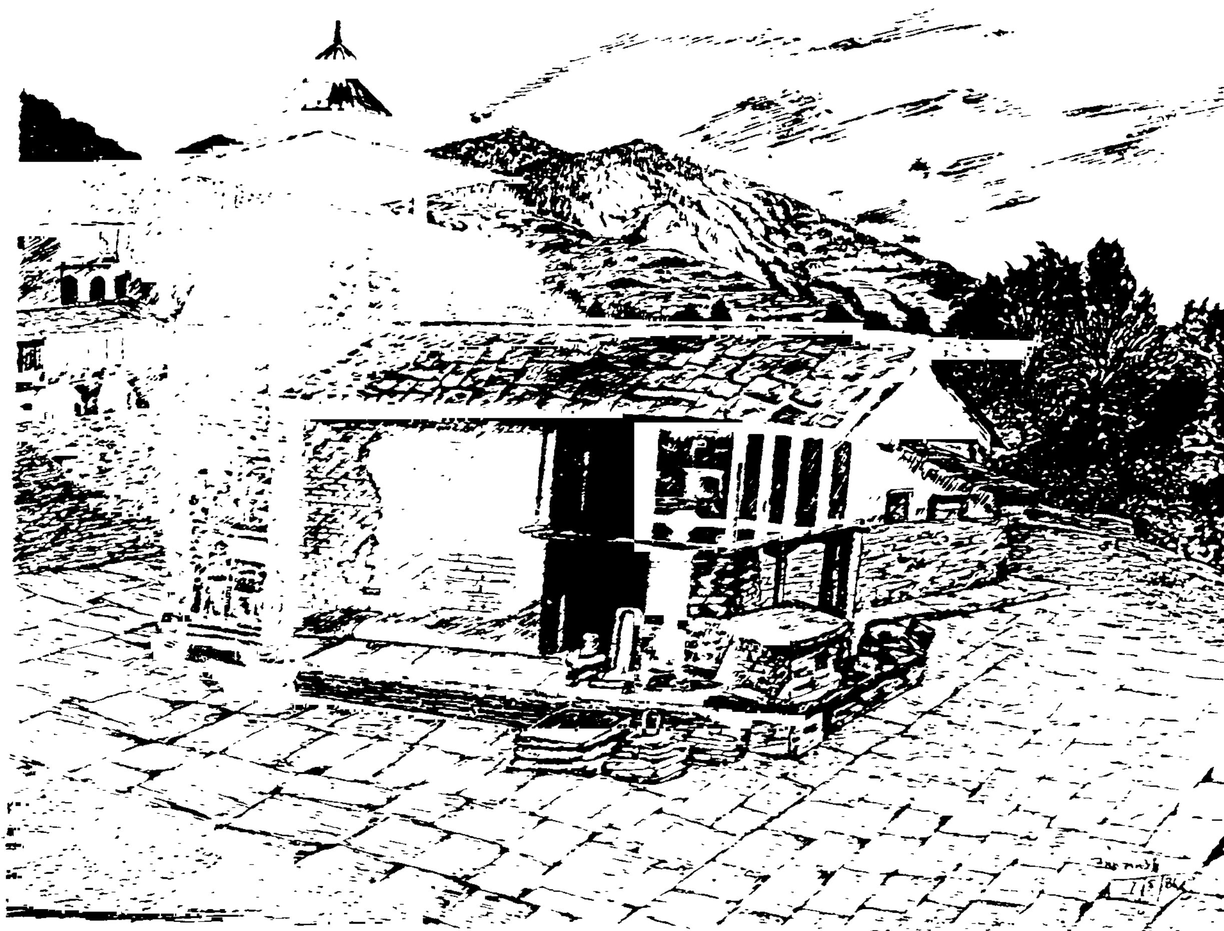


Fig 4. Bhagwati Temple at Lakhamandal

The Archaeology of Banasur Fort, Lohaghat

J.S. KHARAKWAL* D.P. AGRAWAL** DIWA BHATT***

Introduction

The antiquity of wall making goes back to the Paleolithic times but house making began only in the Neolithic period. Defense structures such as forts, fortified enclosures, citadels came into existence during the Early Harappan times in India. The early examples of defense walls are known from several pre-Harappan sites e.g . Kot diji and so on. Recent discoveries have shown that some of the rural Chalcolithic cultures like Aharians were also making defense walls. Balathal and Gilund both Ahar cultures sites in southern Rajasthan, have yielded strong evidence of fortified enclosure and defense wall respectively (Agrawal and Kharakwal 2003; Kharakwal et al. 1997; Shinde, Pers. com.). The fort making tradition and technology continued down to the Early Historic and Medieval times We have a few extraordinary examples representing each phase, e.g., Dholavira (Harappan), Balathal (Chalcolithic), Kausambi (Early Historic), Kumbhalgarh (Medieval), across the country indicating a long tradition of defense wall making. In fact the Indians constructed some of the most beautiful strongholds with elaborate architecture. The Harappan and Early Historic People often made citadels, enclosures or forts to protect the entire settlement but this great tradition disappeared during the medieval times when forts were made only to protect the king and royal family. The Medieval forts are often found at strategically important locations, e.g., at Kumbhalgarh, Daulatabad, Baudhangarhi and so on.

Various types of forts were made in Ancient India as the literary sources e.g., Rigveda, Ramayana, Arthasastra indicate. Mathur (1986:5) and Misra (1981) mention different kinds of forts, e.g., *Audaka* or *Jal durga* (water forts), *Giri* or *parvat durga* (mountain fort), *Vanadurga* (forest fort) and *Dhanavana* (desert fort), *Nagarkot, Dhulkot, Damrukot, Vishambhumi kot, Vishamakhya* that are illustrated in ancient literature. It seems that the available geography led ancient societies to make different kinds of forts for their safety. Among these *Giri or parvat durga* (mountain fort) is considered to be the safest one.

In Uttaranchal there are remains of a large number of forts mostly belonging to the Early Medieval and Medieval times, e.g., at Pithoragarh, Champawat, Almora, Baudhangarhi (Gwaldam) and most of them can be termed as giri or parvat durga. The mountainous region of uttaranchal has ideal topography for such forts. According to a local legend there were as many as 52 forts in Garhwal region itself. In Uttranchal forts are generally devoted by the words *garhi* or *kot* Though

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there are a large number of villages or place names with suffix kot e.g., Dhulkot, Tharkot, Barakot, Munakot, Dhumakot, Chandkot, Tilorakot and so on, but we do not have forts at all these places rather dilapidated wooden houses or stone structures are at found at some of these sites. On the other hand place names with suffix garhi or garh generally have remains of stronghold/ forts, e.g., Chandpur-garhi. Here in this essay we could like to discuss results of our preliminary survey of Banasur fort in eastern Kumaun, which may be called a Giri or *parvat durga*.

Fort of Banasur

The fort of Banasur is located about 5 km west of Lohaghat (29°24′2″ N, 80°7′53″ E) on the protuberance of a ridge at about 1910 AMSL. This fort is also known as *Kotolgarh* (Bhatt 1986:11; Pandey 1937:14) (fig.1, fig.2). It is about 90 m long (N-S), 20 m wide (E-W) and with a total circumference of about 230 m. The average thickness of the wall is about 2 m. The maximum height of the fort is 8.70 m and it has been constructed in three stages. The earliest or lower most part of the wall (phase first) was raised up to a height of 4 m using natural rock exposures, eminences and mud filling. Subsequently construction of second phase was carried out and the height of the wall was further increased by 2.25 m. This phase is largely made of dressed stones. The last or third phase on top (2.45 m) is made up of ashlar masonry of much larger stones following the counters of the hill which basically determines the shape of the fortification. At the four main corners of the fort, podia with convex profile have been made by this technique up to the height of 6.25 m. The podium tapers conically towards the top and is capped by a smaller podium of 2.45 m. The second podium is built of better dressed stones then the lower part of the podium (4 m). There are as many as 85 large rectangular holes with very steep gradients all around the rampart walls which preclude there use for canons or guns or even arrows. Large opening of the holes probably indicates their use for throwing boiling water or fire on the enemy outside.

The floor of the rampart is marked by many squarish structures with a tank in the central part. This trapezoidal tank has the following dimensions, length 13.05 m to 13.30 m and width 5.10 to 5.00 m and it has 26 stairs at the south-eastern corner reaching the bottom. Its depth was measured 7.79 m. The rampart floor around the tank is plastered perhaps using lime to canalize the run off water into the tank whereas the unplastered portion towards the periphery has a device of holes in the rampart which could drain out the surplus water. Three such chutes are made of stone for draining off water and are visible on the western flanks of the fort.

There are three structures to the north of this tank and two rectangular rooms to the south (on the southern margin of the fort). In two adjacent rooms on southern side were found structures made into the walls which appear similar to the fire places in a British house. As chances of the fort belonging to the British period are remote and they appear too big for domestic hearths, we therefore surmise that they may have something to do with iron smelting. Our suspicion is supported by the discovery of a big lump of iron ore and a burnt terracotta cake whose reverse has some slag adhering to it (fig.3). Since no slag was noticed on the surface inside the fort we will have to wait until a small scale archaeological excavation is carried out inside. Following are the dimensions of the rectangular structures (rooms):

Room No.	Length	Width
1	17.30 m	6.05 m
2	13.88 m.	5.95 m
3	7.17 m	5.63 m

The entrance to the fort was given from the northeastern part whereas there is another gate on the southwestern corner also. No doors were found at these entrances, however the stone columns with small shaft holes suggest that there may have been thick and strong wooden doors to close these gates. There is a small rectangular room inside the fort at the main entrance (northeastern), which may have been used for flag hoisting.

Two interesting stone sculptures were found inside the fort. One of them has a floral carving whereas the other stone bracket appears to be a canopy or a mantle piece like object, which could have capped an entrance. The figure of the canopy has a tiger or a lion resting its head on the two fore-paws in a very naturalistic manner.

Even the floral pattern on this canopy appears alien to the local tradition. The most remarkable piece of evidence comes from a hole on the rampart. A flat stone slab bears a design which has been placed inside a rampart hole. There is no sense of a carved stone inside a hole in the rampart. This evidence therefore strongly suggests that the upper part of the fort was made by people who had no respect for the religious sensibilities of the earlier people. This could be interpreted as a break in the tradition or invasion by new people. There is hardly any other surface evidence in this fort by way of inscriptions, potsherds etc. However, the local tradition is unanimous in ascribing the fort to Banasur who probably ruled the valley only for a short time. Future studies could point out whether this fort has any Assyrian (Banasur= Asur-Bani-Pal?) affinities.

The fort has been built at a strategic location as it provides commanding view over the entire Lohaghat region including the iron working area. Interestingly it is not visible clearly from a distance despite being very prominent. Hence this feature appears to be the beauty of this fort. It is likely that this fort may have been renovated during the reign of Chand kings as their capital was hardly 15 km away from Lohaghat. The ashlar masonry of the upper part of the fort is identical to the fort at Champawat, datable to the early medieval times. Knowledgeable villagers at Medi Dhek informed that the Diwan (ministers?) of Chand kings also lived in this fort and a copper plate issued by them is believed to be with villagers. Unfortunately, it was not traceable during our exploration.

Ukhakot

Ukhakot is located about half a km to the northeast of Banasur fort is another hillock (1945 AMSL) of the same ridge. There are remains of a structure, visible on the surface, enclosed by a roughly strong circular wall the diameter of which was measured 30.80 m NW-SE. It has been built in two stages and has survived up to a total height of 2.80 m. The lower part of the wall is hardly 80 cm high and exposed on the northern side. It appears to be the foundation of the enclosure whereas upper part of the wall, which has survived only 2 m, is slightly tapering towards top It is made of relatively more dressed stones. As the southern and western part of the enclosures is entirely covered by thorny bushes it could be examined only on the northwestern part. The enclosure has been made of large stones the average size of which was noticed 35x20x18 cm and the gap between large stones has been filled by small flakes and mud. It appears that initially this wall might have been higher than what it is today. There is a small relief (18x17.30 cm) in the central part of the enclosure, which looks like a low mound. Walls of a rectangular stone structure are exposed on this low mound. A small shrine on a rectangular platform (5.20 m x 4.40 m) dedicated to Ukha or Usha has been made on the central part of the mound. A circular platform (dia 2.50 m and height .35 m) is located close to this temple on top of which is placed a quartz boulder (.27 m high). The purpose of this structure is unknown. According to a local legend Ukha was daughter or Banasur. Fragments of Red Ware bowls with flared sides and medium size jars with varied externally projecting rims, deep basins were also found at Ukhakot, on the steep of slope of Banasur fort hill and from the agricultural fields at the foothill. All of them were coarse fabric, with out any slip and wash. They may have been associated with the last phase of the fort.

Folktales

There is a strong tradition of folk stories in Kali-Kumaon which needs to be studied for reconstruction of the Early History of this region. Folk songs, jagars (oral epic traditions) and folktales all reveal connection of Asuras with this region and iron technology. According to the local tradition several shrines like Asurchul in Pithoragarh, Ghatku and Hidimba in Champawat, Betalghat in Nainital, Betal shrine at Lukhani near Banasur, Sui near Banasur and others associated Asuras. Various folk stories related to the Asuras are in vogue about these shrines. Here we are not going into detail rather we would like to give a brief description of a folktale connected with Banasur fort.

According to the villagers in Sui and Bisang areas Banasur was an Asur (demon) king in Dwapar Yuga who built the aforesaid fort. He had a sister/daughter? called Ukha or Usha, whose residence is known as Ukhakot. Chitralekha, a daughter of a minister of Banasur, was her friend/maid servant. One day Ukha dreamed her would be a husband and Chitralekha, who was very good at drawing, prepared line drawings of a person hearing the expression of Usha. As soon as she drew the figure Ukha

identified him as Aniruddha, grandson of lord Krishna. Subsequently Usha went to Mathura/Dwaraka to bring Aniruddha at Ukhakot. With the help of Chitralekha she abducted Aniruddha to Ukhakot.

According to the local legend Banasur was devotee of Lord Siva and built a temple of lord Siva at Sui, a village near Banasur. He frequently visited Kailash to worship lord Siva before constructing the temple. It is said that lord Siva himself by showing Banasur a red flag told that his rivals have appeared on the earth and soon came to know the incident of Aniruddha, who had been highjacked by Ukha at Ukhakot. In the mean time Lord Krishna had also reached Shronitpur (the modern Sui) (Atkinson 1884:730) in search of his grandson and all the locals gods had congregated in favour of Aniruddha and lord Krishna to fight against Banasura. Though Banasur had blessing of Lord Shiva, Mahadeva himself had the Army of Gods. At a very crucial stage when Banasur was about to face death by the Chakra of Lord Krishna. Shiva informed him that Banasur has been blased by him so he should not be killed. But finally Siva withdrew himself from the battle and goddess Bhagwati fought with Banasur and killed him. The battle continued for several years, Banasur's army was defeated and a large number of Asuras were killed. As result of this the colour of the soil of Shronitpura turned red. It is therefore the town is called Lohaghat, the river Lohawati. One may even attempt to highlight the supremacy of Vaishnavism over Saivism from this kind of legend.

The Asur myths are quite common in Garhwal and Himachal Pradesh too. Dr. Govind Chatak, in well known book *Madhya Pahari ka Bhasa-Sastriya Adhayan* writes that Usha and Aniruddha got married at Ushinmath (Ukhimath!) in Garhwal and Banasur was king of Bamsu region. Legends in Himachal Pradesh also reveal that he was a very popular king of Kinnaur Pradesh. Handa of attempts to identify Sronitpur of the folktale with modern Saharan and writes that Hirima or Hidimba is also a very popular goddess in Himachal Pradesh like Eastern Kumaun. Though some scholars (Saklani 1998) conclude that Asur and Nagas are the same people, we however do not want to go in such discussion here.

These folktales appear to be indicating two aspects. Firstly, Asuras were very popular in the Himalayan region and the battle was fought far back in time and no known historical king of Kumaun participated in it. The second is that Banasur obviously was an invader and an alien against whom the local gods and goddesses fought. Moreover, the local tradition does not hold him in high esteem and it was a brief episode in the local history. There are many stories about the battle between Banasur (Asur-Bani-Pal?), the Assyrian king and Krishna. Manaskhand (part of Skand Purana) also mentions that Asura (demons) were flourishing in Kali Kumaun during the Vedik times (Pandey 1990).

Metallurgy

Uttranchal has very old tradition of metallurgy. In fact iron and copper smelting tradition continued until the British rule. Although we are not aware of any purely Bronze Age site from this region, the discovery of a large number of copper anthropomorphs, which look like prototype of the Ganga Valley examples, apparently push the beginning of metallugary in 2nd millennium BC. There are traditional copper and iron smiths in this region known as Tamtas and Agaris respectively. In recent years a large number of Meghalithic burials have been found at several sites in Uttranchal. Some of them also have yielded iron (Agarwal *et al* 1995: Khanduri *et al* 1998-99). Perhaps the author of these burials were the first iron using people in this region. Agarwal (1999) has shown that this region played a very important role in supplying metal to Ganga Doab (Agarwal *et al* 1995). Now we have even a radio carbon date of Uleni for iron smelting going back to the first millennium BC (Agarwal and Kharawal 1998). In Uttranchal several villages are known as Agar where generally, evidence of ancient mining or smelting has been found. From eastern Kumaun also ancient iron mining and smelting has been found. From eastern Kumaun also ancient iron mining and smelting has been reported by several scholar particularly from Kalikumaon, Dhyani-rau, Mangal-lekh, Kimukhet (Atkinson 1884; Vaishnav 1977:9).

According to the folk knowledge iron/ iron utensils or tools of Lohaghat were considered to be the best in entire Kumaun. While exploring the fort we were also looking for the evidence for ancient iron working in the area around as the Asuras elsewhere (Roy 1926:147-152) are associated with early iron technology. The place name like Lohaghat for town, Lukhani for mine and Lohawati for river clearly indicate iron working as *lu* in Kumauni

stands for iron *khani* for mine. The discovery of a round terracotta cake inside the fort was quite interesting to which slag was sticking. We therefore feel that the area around the fort could also be one such early pocket of iron working associated with the Asuras. Coupled with this here the local legend and the name of the fort itself was encouraging to look for evidence of iron smelting. Hence our interest eventually increased manifold to look for archaeometallurgical evidence. In fact elsewhere (Agarwal and Kharakwal 1998; Kharakwal *et al.* in press) we have discussed the issue of early beginning of iron and possible connection of Asuras at length.

Lukhani

There is an ancient mining site close to the Banasur fort in a ridge called Lukhani. It is located close to village Medi Dhek. The entire Lukhani ridge is full of iron bearing rock. On the southern slope of the hill we found as many as seven large pits, which can be termed as mining shafts for taking out ores. They are circular and oblong pits, ranging from 2 m to 7 m in diameter and 1m to 5 m in depth. No metal object or antiquarian material was found at this site, but the pits are obliviously dug to reach the iron rich minerals. A 5cm thick vein of ore was noticed in one of the rock exposure close to the mines, which was sampled for XRD analysis. It turned out goethite ore. At the foot of the Banasur hill we also found streaks of dark red rock which appears like cinnabar. Some of the rock pieces look more like cinnabar (arsenic sulphide). It is possible that both arsenic and iron were extracted from this region. This has to be confirmed by chemical tests.

Close to these mining shafts considerable amount of iron slag was found scattered on the gentle slope of the Lukhani, the concentration of which was noticed close to an old oak tree. While surveying the area we could not locate any smelting furnace on the surface. But sizeable amount of slag depleted through time clearly indicated that there must have been furnace(s). The slag pieces were small, nodular, black mixed with scatter of quartz cobbles. Huge chunks of slag with fluid impression or fused once were not seen at the site, which indicate that they may have used primitive simple slag pit furnace for smelting. It is quite likely that might have used some flux material while smelting and the temperature was not raised up to 1400 C or 1500 C. The slag was found spread in large area perhaps by its use as heavy stone for throwing on cattle and goat to drive them away. Some samples have been collected both for chemical analysis and dating. Near the ancient crossroads (locally known as Budhi), there is a grove of some old oak trees, at the based of the oldest oak tree there are iron implements consisting of a pair of tongs a trident and a lamp installed in a small make shift shrine. All over this region there is a practice to install such iron implements in village shrines or even domestic shrines. They are supposed to be dedicated to Betals, but we do not know if these Betals were associated with Asuras. People engaged in underground mining, according to folk tradition in southern Rajasthan, are called Batels. It is therefore likely that the Betals in Uttaranchal were also involved in mining and iron smithy and perhaps had some relationship with Asuras. Besides, temple there are place names such as Betalaghat (Nainital) but we do not know how this place was named. There are several temples like Asurchul, Hidimba, Ghatotkach in eastern Kumaun, which may have some association with the Asuras.

Conclusion

The legend and myth indicate that early man did make scientific, geological, historical observations and passed them on to the progeny in the form of myths of the past, for example we have observed that the geological events in Kashmir of the formation of the primeval lake, and its draining out, the braiding of the Sutluj into several channels or the marine regression of 20,000 B.P. are all recorded in the form of various legends given in Rajtaringini, *Nilmat Purana* and other ancient works (Agarwal 1990:41). Here in case of Lohaghat and Banasur also the folk legend perhaps indicating a remote date of iron technology in this region.

Considering the folktale and construction pattern of Banasur fort it may tentatively be stated that the upper portion of the fort was made during the medieval times whereas the lower part or the first phase may predate the Historic period. This can be confirmed only when lay down a trench inside the fort and date different phase of the wall. What is interesting is that, the possible connection of Asuras with early smelting sites in this region poses two important question, firstly did the Asuras introduced iron technology in the Central, Himalayan region, and secondly, does the story of battle

between Banasura (a Saivite) and Krishna (Vaishnavite) in the folktale is to record supremacy of Vaishnavites? Or was it a real fight between Asuras and Khasas including the aborigines? Did the latter successfully drive out Asuras whose tenure may have been very short in this region as they are not in high esteem in the modern society either? Whatever it may be, it is obvious from the foregoing discussion that this whole region of Lohaghat must have been an important centre for iron mining and smelting activity since millennia, as the names *Lohaghat* for the town, *Lohawati* for the river, *Lukhani* for the mining area, all points towards the same direction. Iron bearing outcrops are common all over the area

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NOTES AND NEWS

Madarpur Discoveries: Resolution of Some Problems in Protohistory

Introduction

The discovery of 31 copper anthropomorphic figures followed by *in situ* Ochre Colour Pottery (OCP) near the village Madarpur (78° 48′ N, 29° 12′ E) in district Moradabad, Uttar Pradesh (Sharma *et al* 2002), has again shown the veracity of assertions made more than 50 years ago (Lal 1953). At the same time the large number of anthropomorphic figures adding on to the many types already known has shown that these could not have been put to any other use other than for religious purpose. Besides, the thick layer of OCP, its associated coarse red ware and antiquities all throw ample light on the way of life practiced by the OCP people across generations. Madarpur, thus, has produced qualifying evidence regarding these surmises in line with the ever increasing corroborations already known from other sites.

Problems in Perspective

From nearly a century now, various scholars had asserted, that images played an important role in the life of Vedic people. S V Venkateswara quoted many Rgvedic verses hinting towards evidence of the image of Indra (Banerjea 1974). Even though he was supported by Das, the dominant view led by Macdonell held that images of deities did not have such early antecedents. Thus, for many decades, the assertions based on literature remained uncorroborated primarily due to the paucity of material remains. Meanwhile a vast body of archaeological materials was being unearthed in the regions of river Saraswati and upper Ganga Yamuna Doab, which was to give new dimensions to the old contentions. One of the emerging situations was the demarcation of a cultural horizon marked by OCP, frequently occurring in the lower most stratum or as the only evidence of habitation at a site. Searching in the dark, scholars associated the OCP with widely different temporal settings and hypotheses, namely: Early Harappan origin, Late Harappan origin, Aryan origin, refugee Harappan origin, etc. (Gaur 1989)

On the other hand, the increasing frequency of stray findings of Copper Hoards, being known from the earliest discovery in 1822, was also getting wide attention. Scholars attributed widely different origins (Gupta 1989) to these hoards also, namely Mundas, Harappan refugees and Indo-Aryans. In the field of protohistory thus, the mist around unsubstantiated images of Vedic gods, authorship of the OCP as well as of the Copper Hoards remained intact almost till the end of the last century.

Evidence of Association

In 1972, Saipai (Lal 1972) became the first site which yielded definite links between OCP and Copper Hoards. There were supporting evidences (Gaur 1989, Gupta 1989) from Bargaon, Bahadrabad, Rajpur Parsu and Mirapatti (Kumar 1999). However, even though OCP and Copper Hoards complemented each other towards the wholesomeness of an assemblage, scholars at large desired more corroboration as, often the two were found separated by space. Gaur (1995), while emphasising the link between OCP and Copper Hoards, likened the hoards as cult objects of the OCP people. These, according to him, were deliberately installed in hoard form not far from habitational area. He cites the age old tradition of the ancient Kṣatriyas who worshipped their weapons of war on specific occasions. Pertinently, the latest finding of 31 anthropomorphic figures from the contempory

deposits of OCP from Madarpur (Sharma *et al.* 2002) in Moradabad district is another strong evidence towards the two sides of the same coin, i.e., OCP / Copper Hoard Culture. Thus, what had been contented way back in 1953 by Lal has now been shown to be correct half a century later, especially, due to Madarpur findings.

Madarpur has also convincingly proved yet again, the physical existence of the elusive images of Rgvedic Indra that had acquired form, after they were linked with the anthropomorphic images, by Krishna Kumar in 1987. He quoted several Rgvedic and an Atharvavedic hymn (Kumar 1995) in which making, decorating, hiring and other aspects of Indra image has been mentioned. Sethna (1994) opines as for the worship of icons, we may affirm that although it may not have been a practice particularly prevalent in Vedic times it is essentially nothing at variance with the Vedic spirit. They are vividly described, splendidly imaged, brought intimately home to the devoted mind". Mishra (2000) went further and suggested that the anthropomorphic images of Indra were being produced by the village coppersmiths, perhaps, for installation in every home.

The Madarpur Discovery

The unique finding of the largest hoard of anthropomorphic figures in the year 2000 followed by excavations the next year, has yielded many clues corroborating earlier contentions. The occurrence of anthropomorphic figures as a hoard in the contemporary deposits of OCP has once again shown the inseparability of the two, without any ambiguity. Further, not withstanding the differences amidst anthropomorphic figures from different sites, it is important to note that all the 31 images have different dimensions, shapes and other attributes (Sharma *et al.* 2002). The above fact of not having standardization, restricts its use as a tool or a weapon especially when it was to be used by a single group of people. For instance different shapes of arrowheads are known to be made in the same tribal areas of Madhya Pradesh. But then, these are easily identified with different sub-groups within the area. In the case of Madarpur, however, the anthropomorphs were held by a person within the village cluster, thus denying its use as a tool/weapon, on the surmise that tools of a homogenous group would have close resemblance in shape.

It is not that the anthropomorphic figures alone have differences in shapes, sizes and weights but it differs in the areas of bluntness and sharpness also. Madarpur has singularly shown many different combinations on the edges of these figures, thus proving their unsuitability as a tool/weapon. Further, as elsewhere from Madarpur also the hammering of the anthropomorphic figures causes it to be work hardened and liable to fracture, unsuitable for any tool. Pertinently, 4 out of 31 anthropomorphic images had one arm broken. The percentage of breakage comes to nearly 13%, that too when it was with the vendor. One can imagine the state of those objects if it were to be used as a tool/weapon. On the other hand icons, being executed delicately so as to attract the attention of the devotee in general, suffer higher breakages during transit.

Evidently, more than the utilitarian aspect, the copper smiths imagination played a more important role. Thus, the unique images with one arm upraised not only negates all claims of anthropomorphic figures as tools/weapons but also hints towards an image of a deity (Sharma *et al.* 2002). Indra as the deity, may have been depicted herein as hurling Vajra (Kumar 2002A) or else it could have been showing him as powerful and victorious or a tool indeed, albeit as a symbol held aloft as the socio-religious common thread of the Vedic people. These copper anthropomorphs were held high by inserting them into a vertical socket on the top of high wooden posts may be the genesis of Indradhvaja, perhaps as early as the Late Rgvedic period (Kumar 2002A, Sethna 1994). One could as well have a guess that the area between Bankot and Madarpur, both having legless (stumpy legs) anthropomorphs, saw the first use of Indradhvaja, the *dhvaja* being a moving sanctified post of the Vedic period (Chaturvedi 1997).

Besides the images of Indra as mentioned in the Rgveda, there are other evidences of the religious life of the people of Madarpur. The presence of brick bats and burnt clay lumps suggests that fire altars were also in vogue. This appears all the more convincing when one compares the fact that the residential structures so far revealed have used mud or wattle and daub. At other OCP sites like Lal Qila (Gaur 1989A) use of burnt bricks and mud bricks has been noticed even though the houses were largely constructed of wattle and daub. The discovery of burnt bricks being a natural corollary of *isti* or sacrificial fire (B Singh 1995).

The Vedic way of life is clearly discerned by the nature of antiquities obtained from Madarpur. It is noteworthy that out of the 37 stone objects recovered during excavation, 27 are identified as pestles (Sharma *et al* 2002). The remaining pieces are also associated to grinding operations. Significantly, many of the stone pestles may have been used for extraction of some juice, besides pounding food grains. Sharma *et al.* (2002) has identified very smooth surface of the functional portion of pestles, in some cases. This perhaps tallies with what Bhagwan Singh (1995) had enumerated from Rgveda, as under: "The mortar was called *drasada* and the pestle *upala* This was perhaps used for extracting a small quantity of soma. The pestle was revolved with hand and thus the juice was called *hastacyuta*". The finding of perforations in OCP potsherds hints towards the straining of some juices by keeping wool inside the perforated vessel. In this context, bases of a goblet and a bowl having graffiti marks that resembled to some extent, ramifications of a bushy plant, shorn of leaves have been found from Madarpur, perhaps, depicting the original soma, mentioned in the Rgveda.

Regarding the identity of the soma plant, one is tempted to associate it with sugarcane as suggested by Bhagwan Singh (1995), also due to its abundance in the Doab region. However, sugarcane/juice cannot be extracted by the vertical rotary motion of simple pestles, turned by hand. Moreover, the name *soma* or its variations are not associated with the sugarcane reed but with many other plants including creepers and bushes. In his words "soma became a mystery to some users, soma producers and soma consumers themselves". However, his assertion that *tulasipatra* signifying the botanical aspect of soma continued to be served in *pancamrta*, deserves attention as the original *soma* might have some similarities in appearance to the plant, tulsi. Pertinently, the seal from Lal Qila bearing the figure of a "holy plant, resembling tulsi" (Kumar 2002), evokes interest.

The vibrance of the community is also revealed by other antiquities obtained through the excavations. Although the volume of excavations and, therefore, the anthropogenic deposit was not large, yet it gives a simple idea of the site; albeit subject to correction on fresh data. The presence of fragments of terracotta toy cart and terracotta wheels of four different sizes in a general background of paucity of antiquity types, hints towards the importance given to transportation. Even though no weapons barring a broken terracotta sling ball, was recovered from the excavations at Madarpur. The weapons found elsewhere as part of Copper Hoards matches the Rgvedic description. Thus, as a whole, Madarpur has shown the pristine way of life led by the Vedic people as a largely independent village community, albeit well connected with other OCP sites. Perhaps some Rgvedic hymns might have been inspired and conceived in the region around Madarpur.

Conclusion

With indisputable linking of OCP and Copper Hoards and the surmised association of the pristine Vedic community with these archaeological remains some related problems in protohistory has been resolved. However, the temporo-spatial range of the OCP remains enigmatic, without any possibility of clear picture in the near future. Several scholars allude a Early Harappan / Harappan / Late Mature Harappan origin to the same (Sahi 2002, 2001, Kumar 2002).

Several scholars suggest that the OCP people were contemporary to the Harappans (Dikshit 1989, Possehl 1993). Regarding the spatial extension also the workers in the field are not unanimous. Generally, it is believed that OCP occurs in the upper Ganga Yamuna Doab and adjoining regions, including Rajasthan. Yet expression of doubt regarding veracity of the OCP from Ganeshwar and Jodhpura has been known (Dikshit 1980, Kumar 2002). Possehl (1993) is of the view that there are several variations of OCP of which at least one is contemporary to the Harappans. Pertinently, different types of anthropomorphic figures also suggest that these village communities although well connected, ideologically were largely independent and, therefore, the variations.

On the other hand, statistics regarding OCP from Saharanpur Distt. also draws attention towards the large temporal expanse of this culture. Of the 81 sites with OCP reported from this district (Ghosh 1989), 25 (30.8%) have Harappan assemblage, while 11 (13.5%) have Late Harappan remains from the site. There are 23 (28.3%) sites which are mono cultural with OCP assemblage alone. Whereas, there are 22 (27%) sites which although have no antecedents like the last mentioned class, shows 11 sites with OCP followed by PGW and other 11 sites

showing OCP followed by much later cultures like Sunga, Kushan and medieval period. From the above data, atleast an element of contemporaneity is clearly discernible, looking at 25 (30.8%) sites having both OCP and Harappan remains. It also spans the gap upto the PGW culture showing that, a key to the enigmatic millennia between Harappan and P.G.W. cultures lies with the OCP / Copper Hoard Culture.

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Unique Terracotta Figurines from Megalithic Urn Burials at Malampuzha, District Palaghat

Recently a megalithic urn burial and some terracotta figurines were accidentally discovered from a plot of land near Malampuzha dam (Long. 76° 41′ N; Lat. 10° 49′ E) in Palaghat District. A salvage archaeological excavation conducted here, revealed large and small urn burials, with distinct characteristics. The larger urns were of the usual pyriform type noticed in other Megalithic sites of Kerala and Tamil Nadu. The smaller urns were bulbous and associated with an amazing variety of terracotta figurines. Nearly forty terracotta figurines in various states of preservation were found and till date this is the largest terracotta find from the Megalithic context in India. Briefly dwelling on the excavations, the typo-technology and significance of these terracotta figurines are being discussed below.

The Site

The urn burial site roughly, 25 sq. metres, is situated at Manthakad, a locality behind the pump house supplying drinking water from Malampuzha dam to Palaghat city, situated 12 kilometres south of the site. Slightly elevated from the surroundings, the site is on the right bank of the Malampuzha River. It is highly disturbed due to agricultural operations and foundation of a house dug there. There is a gneiss outcrop to the south east of the site, which slopes further to the south and then rises up creating a water pool. The soil deposit towards the north of the rock formation is over two metres, while closer to the outcrop it is hardly two to three feet. The upper soil is dark brownish in colour and to the bottom it is rather sandy disintegrated gneiss rock. The accidentally exposed large urn was located to the north of the site, where the deposits were larger and the terracotta yielding smaller urns to the south closer to the rocky outcrop where the deposit is meagre.

The Excavations

Excavations revealed a pit of around 120 cm deep with a pyriform burial urn. The hand made urn, is of a thick rim and coarse fabric measured around 95 cm in height and 65 cm in circumference at the mouth. At its shoulder, was an applique strip with fingertip designs, below it the body was tapering at the bottom. The mouth of the burial urn was covered with a large basin like lid, which was found broken and globular inside the pot. Around the urn at the top, was cairn packing and sealing; it was a single large gneiss capstone. Associated pots placed externally towards the bottom of the urn were found in a badly crushed state. The ceramics noticed include, red ware, grey ware and black and red ware. The shapes in red ware and grey ware were generally vases with out-turned beaded rim. Shapes in black and red ware were mostly bowls. No iron objects were noticed during the excavations, though two short iron swords were retrieved from the site during an earlier dig. This burial was also devoid of bones and terracotta objects.

Trenches closer to the rock formation yielded nearly five small globular urn burials. These urns measured between 30-35 cm in height and were interned into shallow pits. They were covered with a trough like lid or urn and then sealed by small capstones. The bulbous lower urn has a thick beaded rim and just below it was an applique strip with finger markings. At the shoulder is an applique ledge. The space between the applique strip and the ledge were grooved with lozenge and similar designs and the body beneath the ledge was bulbous. In some pots starting at the shoulder ledge and extending over the

globular body were applique mother goddess figurines, contained within another ledge at the bottom. The upper troughs like urns have a flat 'nail head' like rim. Both the urns were hand made and of coarse fabric. The associated pottery was exclusively red ware. Shapes noticed are mostly vases and bowls. Black and red ware and iron are conspicuous by their absence in all the five urn burials discovered. Associated finds include, fragmentary human bones, beads, hop-scotch and a large number of terracotta figurines scattered around the urns. The small sized bones and hopscotch recovered indicate the burials were probably of children. Most of the terracotta figurines strewn around the urns were noticed to be intentionally broken probably as part of some burial rituals (Pl. I & II).

Terracotta figurines

Typo-technologically the whole gamut of terracottas retrieved from Malampuzha may be divided into applique figurines and in-the-round figurines.

Applique figurines and its technique

Applique figurines adorn the exterior of the burial urns and are made of the same material as the urns. The head of the figurine is attached to the applique ledge on the shoulders and the body extends over the belly of the pot and the legs are contained within a ledge at the bottom.

In order to create a firm adhesive surface for the relief figurine, criss-cross lines are etched on the exterior surface urn with a stylus of stone or metal at rather hard stage and over it clay lumps or pellets are affixed and the desired form is modelled. Excess clay from the modelled forms is removed using a scalpel like instrument of either iron or split bamboo. The use of this instrument has induced a certain angularity in some of the figurines. The modelled figurines are further decorated using appliques, etchings, grooving, punching etc. The pot is fired subsequently.

Themes represented

Themes of the appliques are basically mother goddess figurines, apart from some grotesque creatures and animals. As mentioned earlier, these small urns apparently contained burials of children. This is probably one of the reasons that many mother goddess figurines were found on and around the burial urns. Mothers are embodiment of eternal love, care, affection and protection, their depiction on the burial urn may be to assure to the dead child of their bonding even in the realm of death.

A brief description of some of the applique figurines

Only one of the applique mother goddess figurines has been found fairly intact and it measures a maximum of 16.5X13.6 cm (Pl. III, 3). The image commences at the ledge on the shoulder of the pot and continues downwards. The head is apparently adorned by a close fitting cap. The facial features are rather crude, narrow forehead, round face, bulbous eyes, snub broad nose, thick large lips and large fan like ears. The neck is short. Arms are raised up to the shoulders and the palms, though not clearly demarcated, were placed over the chest as though wailing or mourning. Breasts are small conical projections over a shallowly depicted torso. The hip is broad but rather linearly modelled and adorned with a girdle, which is embellished by some grooving. The legs are not clearly demarcated. A potsherd with an applique female figure has been reported from Melperumpalam near Poompuhar in Tamilnadu. This figure appears to be of an aged lady as indicated by her hanging breasts. The other physiognomic features do have a superficial similarity with that of Malampuzha. This figure is considered to be the portraiture of the person interned in the urn (Sridhar 1992: 68-70).

The animal depicted to the left of the goddess is probably that of a horse. The skeletal and artifactual evidences from many sites in peninsular India have borne out the association of horse and megalithic people. Caparisoned horses were probably sacrificed and buried along with owners as though to ferry them to the realm of death and is evidenced from sites like Takkalghat and Khapa (Deo 1970: 42). Horse bits are also evidenced from sites like Sanur in Tamil Nadu (Banerjee and Soundra Rajan 1959: 8).

Another potsherd bearing a broken female figurine measures a maximum of 11.5 X 7.6 cms (Pl. III, 2). Only part of the torso and arm remains. The arm is curved without clear demarcation of palms like the stone

anthropomorphic figure from Mottur or Madimalla (Narasimhaih 1980: Pl. . and Rao 1988: Pl. 4). The feminity of the figure is eigtened by this breasts and splayed hip

In four other potsherds retrieved, all that remains is the upper ledge affixed with heads of some figurines. These have stylistic and facial similarity with the large figurine discussed above and hence appears to be females. In some of them the hair is demarcated as incised lines and one of them carries an umbrella like element over its head (Pl. III, 4,1 and Pl IV, 1, 2)

There are two potsherds that bear figures and it is difficult to assess wheather they are human or not. One of them has weird grotesque features with a rather pinched up face, round appliqué eyes and large elongated fan shaped ears like that of a goat. The smaller figure appears to be that of a cow (Pl III, 5, 6)

In -the- round figurines and its technique

In-the-round images are entirely hand-made and encompass both solid and hollow components. Many specimens have their heads and the neck solidly made. The neck is crafted into an elongated stem, which is inserted into the hollow torso and then luted. There are also specimens wherein both the head and body are hollow. The arms and legs are generally solid, separately made and then luted to the torso. Details of the physiognomy, coiffure, costumes and ornaments are created by way of appliques, punching and grooving, etc. The finished terracottas were dipped in a thick reddish slip and then kiln fired, to medium temperatures.

A brief description of some of the in-the-round figurines

One of the largest surviving specimens of the hollow variety is a female torso It has a maximum length of 14 6 cm and width of 9.3 cm (Pl. IV, 5). It is hand made of fine levigated clay, dipped in a red wash after finishing and then burnt. The head, arms and legs are broken. The neck is adorned with an applique necklet or torque The firm round breasts bespeak its youthfulness and fertility The belly slightly bulges out as though indicating pregnancy. The hips are flayed and the genital is pierced into a large hole that opens into the hollow torso of the figurine as though suggesting childbirth.

Another female bust of hollow make measures a maximum of 8.7 X 7 cm (Pl. VI, 3). The hair is parted at the median and braided into small locks, which fall up to the shoulders, like those of African women. A figurine with a similar hairstyle has been recovered from a megalithic site in Salem (Foote 1916: Pl. 22). The braided locks are created by applique strips, which are detailed by grooving. At the centre of the head is an incised cleft opening into the hollow head, as though indicating the practice of trepanning. The face is round but its details are rather obliterated. The ear-lobe is pierced and its distended end extends up to the shoulders and the ear canal too is perforated Around the neck is a torque or necklet with a circular pendent. The round bosoms bespeak of youthfulness.

An interesting therioanthropomorphic figure in-the-round solidly made bust recovered appears to be that of 'Cow-Goddess' with a maximum measurement of 9 X 6.6 cm (Pl. IV, 4). The bovine snout is fairly intact except for the lower lip The eyebrows are thick ridged and eyes bulge out. There was either a headgear or horns on the head which have given way. The ear lobes are pierced and extend up to the shoulders. The ear canal too is perforated. Around the neck are two applique roundels probably indicative of bovine udders. Around the neck is a necklet or torque with a pendent created out of an appliqué strip. The bosoms are round and youthful. Bespeaking her fertile and nourishing character. The arms are broken beneath the shoulders As mentioned above, there is another small potsherd from here that contains a representation of cow Previously a cow shaped sarcophagus has been reported from Kattakampal (Leshnik 1974: 86). This 'Cow Goddess' representation has no parallel in India The closest parallel may be from the Egyptian goddess Hathor also represented as a cow and considered a fertility symbol and a mother goddess par excellence (Srivastava 1979: 19). Faunal remains from many megalithic sites in south India indicate that cattle predominate over other domesticated species and cattle keeping were probably their major preoccupation (Moorti 1994: 37) This is probably one of the reasons for cow being assigned the status of a goddess and creation of its icons.

There are some solidly made figurine heads Their

physiognomic features indicate male sex. The largest specimen measured 10.6 X 5.5 cm (Pl.V.1). They generally have shallow foreheads and large eyes. The eyes were modeled either by channeling or grooving the area around the eyes so as to bulge it out without eye lid or the eyes are incised in lozenge shape (Pl.V. 3) and rarely as applique roundels (Pl.V. 5). The hair, nose and lips were created by appliqus. Their nose was large and aquiline and the lips thick. The physiognomic features divulged in these figures seem to draw similarity with the ethnic stock from the Middle East or Palestine rather than Dravidian. In some cases these applique lips and nose have come off resulting in grotesque looking forms (Pl. V. 6, 5). The ears were large and prominent lobe pierced extending to the shoulders and the ear canal.

Discussion

There has been a dearth of mother goddess figurines during the post Harappan period in India, more so in south India, where there is hardly any specimen datable to earlier than 1st century BC (Ghosh 1989 267). The Malampuzha terracotta figurines have filled this void, as they essentially revolve around the mother goddess cult, and themes represented include pregnancy-childbirth, spirits, fertility and totemic sacrifices.

During excavations no terracotta in the round were found intact. They appear to be intentionally broken and scattered around the urns. The male figurines may represent anthropomorphic carriers into which evil spirits that caused ill to the children or society were exorcised, captured and finally eliminated by totemic sacrificial rites along with the dead so that they never returned

The terracotta figurines with cleft in the middle of the head may indicate the practice of trepanning and appears to be the first evidence of trepanning in Indian Megalithic context. Trepanning has been earlier reported from Burzahom and Kalibangan Another unique figurine depicting pregnancy and pierced vulva may be indicating the mysteries that are involved with childbirth Such themes have been rarely found in megalithic or other cultural contexts

Logan probably was one of the early scholars to express the opinion that pyriform urn may be symbolic of a womb and had suggestion of fertility He also assumed that the megalithic people had a strong belief in the evil and good power of departed human spirits and worshiped totemic deities. The terracotta figurines from Malmpuzha seem to reiterate Logan's assumptions (Logan 1887: 282).

Date

Stray terracotta figurines have been reported from the Megalithic context earlier, but they do not stylistically or thematically match with those of Malampuzha. The terracottas recovered by Breeks from Nilgiri stylistically appear to be of medieval period. The Kaddatur terracotta show a style that is more similar to the Satavahana terracottas recovered from sites like Kondapur or Ter and dated to the early 1st BC-AD (Dhavalikar 1976.11). Recent excavations at Adhichanallur has yielded an appliqué mother goddess figurine on a burial urn along with some other motifs and dated between 700 BC and 500 BC (*The Hindu*, July 25, 2004, p 11). Stylistically, the 'rope' design on the urns of Adhichanallur appears to be similar with those of Mangadu in Kerala. Since the terracotta figurines from Malmpuzha schematically and stylistically exhibit pristine characteristics incomparable with any known megalithic sites, they deserve to be placed very early some where between 800-700 B.C This dating will be validated if we consider the superficial similarity between the large urns of Malampuzha and Mangadu which is dated to 1000 BC (Sathyamurthy 1992: 10).

Origin

Many scholars in the past have advocated a Middle Eastern origin of Indian megaliths, which was largely based on artefactual and architectural parallels between the two regions Skeletal remains of some of the sites also had hinted at a Mediterranean ethnic stock among the Megalithic people, however, no figural representation divulging vivid ethnic characteristics had been found In Malampuzha for the first time in the Indian Megalithic context, the terracotta human figurines recovered reveal physiognomic features and coiffure similar to the ethnic stock of Middle East In addition to it, the 'Cow Goddess' as stated earlier, has no exact parallels in India and can only be compared with those of Egypt The terracotta figurines from Malampuzha are thus additional corroborative evidence to the advocates of the Middle

East origin of Megaliths in India (Dikshit 1969: 85-89, Ramachandran 1969: [illegible]-65; Gupta 1972: 322-35, Leshnik 1974: 238-251).

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Plate : III. Terracotta Figurines from Malampuzha



Plate : IV. Terracotta Figurines from Malampuzha



Plate : V. Terracotta Figurines from Malampuzha

Centrally Knobbed Vessels in Pottery and Metals of India: A Reappraisal

The centrally knobbed pottery vessels with grooved concentric circles were recovered from a number of sites in the middle Ganga plain. It is a common type in the NBP period on some bowls and dishes. This is available mostly in Black Slipped Ware, NBP ware, grey ware and red ware. At Sarai Mohana, District Varanasi, some dishes and bowls bearing pattern of concentric circles with a raised knob have been recovered (Fig. 1). In a single example at the same site the knob found is long and pointed (Fig.1, No. 3). This new variety of vessel is marked by a lack of elaboration in its shape (Singh & Singh, 2004, in press). At Rajghat, District Varanasi, a few bowls and dishes of the coarse NBP ware and coarse grey ware showing a pointed knob with concentric circles in the centre have been found (Narain & Roy, 1977, Fig. 10, Pl. I). The exact use of these vessels is not known but there is a possibility that they were used in rituals. Those earthen vessels of peculiar shapes and bowls made of pottery were known earlier from Sisupalgarh, Budhigarh and Jaugada from Orissa, of stone and silver from Taxila, of copper-bronze from Agiabir, Uttar Pradesh and Wari-Bateshwar, Bangladesh are still enigmetic. These are known from other parts of south-east Asia i.e., Myanmar and Thailand also.

It has no fixed shape though it starts in the Bronze Age and continues in the historic period. Ahmed (2001, 50) pointed out that the concept of knob originated in India and according to him the material remains of high tin bronze originated in south-east Asia. Since most of the centrally knobbed vessels were recovered from Megalithic burials and one granitic vessel from a Buddhist stupa of Taxila, Glover (1989) equated these vessels with ritual and funerary use. He presumes that these vessels were not of every day use. In Buddhist concepts he has equated it with the 'Mandala' – a schematic cosmological symbol, representing Mount Meru and the surrounding ocean. This clearly represents the penetration of Buddhist cosmology to South-East Asia. Ray (1994) also made similar assumption and equated it to Buddhist religion. Pathan (1989) also equated the place of occurrence as a burial site at Wari-Bateshwar. Perhaps Glover's equation of all the bronze bowls from south-east Asia as grave-goods was related to some findings only. However a similar object found at Agiabir would perhaps change the assumption of there scholars. The find from Agiabir is definitely a centrally knobbed vessel. It undoubtedly establishes the fact that the bronzes of Agiabir were exclusively used as domestic objects and not as funerary ones (Singh and Chattopadhyay 2001-2002, 2003). The details of objects from Myanmar are not available at this moment.

From the published reports a number of objects identified as centrally knobbed vessels are tabulated in Table-1. The regional break-up, sites, material and present location, have been shown.

As mentioned earlier, centrally knobbed vessels are known in large numbers from Taxila, Pakistan. Marshall (1951) referred to the existence of centrally knobbed vessels in red and grey wares, black granite reliquary, silver and copper. Typical round silver dish with knob, 22.23 centimeter in diameter and surrounded by six concentric circles were found. The dish bears a Kharoshti inscription which reads '*Minjukrtasa*'. Three copper knobbed vessels are also unearthed at Sirkap, Taxila.

A number of similar vessels made of high tin bronze from south east and Near East Asia are known. Examples

Table-1 Centrally Knobbed vessels from South-East Asia

Countries	Place	Material	Present location
Bangladesh	Wari-Bateshwar	High Tin Bronze Clay	Bateshwar Museum Narshingdi
India:	Agiabir, UP Sarai Mohana, UP Sisupalgarh,ORISSA Budhigarh, ORISSA Jaugada, ORISSA Nagarjunkonda, AP Harinarayanpur,WB Chandraketugarh, WB	High tin Bronze Clay Clay Clay Clay Clay Clay Clay	AIHC, B. H. U., Varanasi Do ASI, New Delhi ------------ ------------ ------------ ------------ Asutosh Museum, Calcutta
Pakistan	Taxila	Stone black granite Silver Clay Copper	British Museum London
Thailand	Ban Don Ta Phet	Bronze	
Vietnam	Than Hoa	Bronze	Museé Guimet, Paris

of bowls discovered at Than Hoa province of Vietnam, are now exhibited at Musee Guimet Paris. From the cemetery of Ban Don Ta Phet about 30 such vessels have been found which were made of high tin bronze of about 23% tin. High tin bronze, mirrors are also known from this site

Centrally knobbed earthen pots are known from early levels of Sisupalgarh, Jaugada and Budhigarh, Orissa, and surface finds at Harinarayanpur. The centrally knobbed ware – lid-cum-bowl with inner central knob, circumscribed by a series of concentric grooves or incisions – constitutes a distinctive pottery type at Sisupalgarh (Lal 1948, Plate XLVIB). The Ceramic industry of Budhigarh consists of dishes, bowls, miniature bowls, dish-on-stand, etc. (Mohanti and Mishra, 2002). The most common types are with concentric circles either in the inner base or on the outer surface. These sites have some close similarities with that of Wari-Bateshwar of Bangladesh. It was known that a few bronze bowls of Wari-Bateshwar which was unearthed got melted down. Amongst the fragments of centrally knobbed bowls two of them included circular base. Basa and Rahman (1998), Ahmed (1991) and others have studied the specimens from Wari-Bateshwar. It is known that one of them is with a knob at the centre. The excavations of 2000-2001 at Narhan in mid-Ganga basin, has also yielded a copper vessel with a central knob along with several copper bronze vessels found in a hoard datable to the mid-NBP ware level.

The above-mentioned cache of Agiabir, recovered from Period III, comprised of ten large copper objects. These include two cooking vessels (*handa*), a globular vessel, two bowls, two carinated *handis*, a *lota*, a copper centrally knobbed vessel and a mirror. All these objects are complete and kept upside down, and found in highly corroded state with thick bluish-green corrosion. Metallic core was also detected in the third one but rather thin.

The dimensions stated in the table below have been arrived at after a comparative study of the different scales used by different authors. The Sl. Nos. of Sisupalgarh and Budhigarh are made clockwise in the published photograph. The vessels of centrally knobbed ware of Harinarayanpur was as per Ray 1998. The dimension were not given there. Examples on pottery are being treated first. This identifies the nature of the knobs. This is tabulated in Tabl-2.

From Chandraketugarh, at Gazitalla, a remarkable centrally knobbed grey and red ware bowl with a base or foot in the shape of a ring was discovered (Fig. 6). It has a pointed knob without any ring at the inner side of the

Table-2 Dimension of centrally knobbed vessels of fired clay

Sites	Sl. No	No of rings	Dia. Knob in mm	Outer dia in mm	Each ring mm
Sarai Mohana	1	4	4	28	2
Sarai Mohana	2	2	16	38	5
Sarai Mohana	3	3	17	91	8
Sarai Mohana	4	1	15	22	2
Sarai Mohana	5	2	16	35	4
Sisupalgarh	1	6	12	66	4
Sisupalgarh	2	3	18	46	4
Sisupalgarh	3	11	22	91	4
Sisupalgarh	4		12		
Sisupalgarh	5	9	19	60	3
Sisupalgarh	6	12 exist		130	4
Budhigarh	1	10	20	70	4
Budhigarh	2	5	14	54	2
Harinarayanpur	1	3			

base. The outer central base is circular and deep in nature.

Metallic Vessels

An analysis was made of the knobbed vessel discovered in Agiabir (Fig.3). One of its SEM microstructure is given in Fig. 4. Their dimensions and measurements are recorded in Table-3. Constituents through Chemical analysis were also available for the specimens recovered at Wari-Bateshwar (Fig. 5).

Table-3 Dimension of centrally knobbed vessel discovered at Agiabir

Diameter of the mouth (cm)	Diameter of the body (cm)	Thickness of the rim body (cm)	Height (cm)
27.60	33.60	0.57	3.20

The discovery of knobbed vessel at Wari-Bateshwar (Pathan 1989, Basa and Rahaman 1998, Jahan 1999, Haque *et al.* 2000) also reminds us of similar bowls at Ban Don Ta Phet. One of there bowls bears a knob in circles and the second is broken. A rim like circle surrounds both the specimens. One of the present authors had the opportunity to examine the specimen at Bateshwar Museum. The rim was quite thick and that the knobbed portion appeared to him is a decoration to the bowl used. The metal was analysed by Dr. Manowar Jahan through ICPOES. A fragment of the same is under metallographic observation.

The knobbed vessel of Agiabir was specifically searched more precisely for copper, tin, lead and zinc through atomic absorption spectrograph (AAS). The oxide constituents could not be avoided but the results clearly indicate the existence of high tin bronzes and is shown in table-4.

A fragment of centrally knobbed vessel with a thickness of 2 mm was found polished across its cross-section and solid core was revealed with heavily corroded outside surface. Subsequently it was etched with ferric chloride and ammonium hydroxide, and was observed

Table-4 Major constituent of knobbed vessel by AAS

Site	Cu	Sn	Ag	Pb	Fe	Zn	Ni	Co	Al	Methodology
Wari-Bateshwar	Base	26.0		0.23	0.38	0.14	0.05	0.02	0.04	ICPOES
Agiabir	35.83	17.98	0.02	0.1	0.1	<0.1				EDX

through metallographic microscope, to reveal manufacturing technique. The microstructure obtained through optical microscope indicates no evidence of twins and identifies that it was not annealed after any mechanical working.

SEM-EDX Analysis

For more precise and in-depth analysis, detail identification of inclusions and matrix, and the remaining non-corroded core, all these three specimens were further scanned and checked with SEM-EDX, with Leica S440 scanning electron microscope at Pal. Div. II of Geological Survey of India. The distribution of tin in the knobbed vessel of Agiabir was also scrutinized . The observations clearly indicated the oxidized state of the vessel. This was scanned with SiLi detector (line scanning) through the mentioned instrument. SEM-EDX analyses at three different places were made where SEM obtained microstructures (Fig.3). The semi quantitative average values of the specimens are tabled in Table- 5, showing in atomic %.

No	Cu	Sn	Fe	O	Sb
1.	16.76	18.63	0.82	60.70	1.48
2.	5.62	20.21	0.89	71.42	-
3.	7.48	19.57	0.83	70.70	-

Table-5 SEM-EDX analyses at matrix in the knobbed vessel of Agiabir

Observations

The centrally knobbed vessel though was highly corroded, yet its microstructures were not altered. This is made up of around 19.5% tin, and definitely been accepted as high tin bronze. The microstructure as revealed through SEM-EDX indicates that quenching was performed. The structure clearly indicates that quenching was closest to pure phase. One region (Fig. 3) of structure indicates that it was allowed to cool slowly (i.e., not quenched). It is possible that this part of the object was not quenched or that it was heated enough to allow for the formation of the alpha and delta phases. The Scale bars used in the SEM microstructure is 30 m.

The centrally knobbed vessels are interesting objects and attracted the attention of archaeologists. Our observation with Agiabir's knob is an integral part with a single cast piece. Whereas Glover (1987) had found that more often the knob portion was separately made and riveted through a hole to its base. The specimen of Agiabir, analysed in the present context, has indicated difference in composition and structure. To reveal the manufacturing of the centrally knobbed vessel the traditional bronze making techniques were studied through ethnoarchaeological context. The basic practices in Kerala and also in West Bengal are similar in nature (Srinivasan, 1998; Srinivasan and Glover, 1998 and Chattopadhyay, 2002 B). Tin is added to liquid copper in a crucible in a desired ratio. After melting the liquid is poured into sand moulds and ingot is made. After reheating it is hammered into a vessel by alternate method of heating and forging. It is definitely possible to mention that cassiterite was also added to molten copper. There are possibilities of traditional continuity in the present day practices of high tin bronze making.

Finishing processes, perhaps, made by hammering with wooden mallets and subsequently heating and quenching was carried out. The non-existence of dendrites and twins in one hand and, on the other hand, internal structure of martensite clearly indicates the quenching processes after hot working.

Presence of high tin bronzes has not bee detected in Chalcolithic context in Eastern India. Tentatively it was concluded that use of high tin bronze began in this region in early historic period. The mirror from Chandraketugarh highlights the stages of the metal craft of the early historic period in Eastern India (Chattopadhyay, 2002). The copper bronze objects, particularly the knobbed vessel recovered from Agiabir, highlight the stage of copper bronze objects during 5th to 6th century BC. In India, in subsequent period, the use of high tin bronzes were flourished. Detailed studies on high tin bronzes and mirrors have been made elsewhere (Srinivasan, 1998; Srinivasan and Glover, 1998).

Conclusion

There is enough evidence to state that India and South-East Asia were closely connected. Through close connection in trade, commerce and religion both the

regions benefited. Through archaeological excavations the material remains have been unearthed from different sites of South-East Asia. The most important site of the region is Ban Don Ta Phet, which is located in West Central Thailand in the Kanchanaburi Province. The C^{14} dates fall within a range of 360-390 BC and 15 BC to 430 AD. This is contemporary to Mahasthan and some other sites in India. However, Agiabir's periodisation pertaining to copper-bronze objects is earlier to the sites of South-East Asian sites. Most of the discovered objects have been obtained from different graves, which have been excavated here. The most important discovered objects are beads, bronze vessels and jewellery. The latter were made with bronze, bone, ivory, glass and semi precious stones. The bronze vessels recovered from this site were made of high tin bronze (Rajpitak and Seeley, 1979). XRF analyses indicated the presence of about 23% tin in those objects. Excavations have the fragmentary incised high tin cast bronze vessels with the picture of people, animals, etc. which clearly indicates Indian connections. It was further known as vessels of Bengal origin (Glover 1985; Rajpitak and Seeley 1979). The water bowls made of this material were brittle but its golden appearance (golden colour when freshly polished) was highly esteemed in the society. There are a few more sites in Thailand. The excavated objects from Wat Khlong Thom (referred to by Glover 1996, p. 135) indicate perhaps the expatriate Indian artisans worked under the protection of local rulers. Evidences include the remains of tin smelting and to export tin-short India. The thickness of bronze bowls of Ban Don Ta Phet and also Wari- Bateswar are extremely thin whereas the same from Agiabir are thicker and less sophisticated.

The copper-bronze objects discovered at Sirkap, Taxila were analysed by Mr. Sana Ullah and Dr. M. A. Hamid. Objects under Table II are mostly made of high tin bronzes with a composition of 21.55 to 25.59 % Sn. One of those objects was a dish with central boss (i.e. a knobbed vessel) of 1st c. AD. One mirror of the same date and another one of 1st c. BC were recovered from this site.

The above objects of Taxila were used in general for casting domestic one. Casting products are normally brittle. It was further mentioned that Nearchus, Alexander's admiral, remarked that the Indians at that time employed only cast-bronze not hammered, so that their vessels broke like earthen ware if they fell (Nearchus, fraf.7= Strabo, xv: c 716; C.H.I 1 p. 418.

From the present findings it is clear that there were connections of Eastern India and South-East Asia both on commercial and religious ground. High tin bronze artifacts, knobbed vessels, etc. are only indicating as carrier. Early copper specimens from Non Nok Tha are made of low tin bronzes like in eastern India. The high tin bronze artifacts from Mahasthan, Chandraketugarh, Wari-Bateshwar and Agiabir were not manufactured in South-East Asia. The objects with decorations discovered there have not proved as manufactured in South-East Asia. In historic and subsequent period tons of high tin bronze artifacts and utensils have been made in eastern India as well as down to Kerala. If Tamralipti's copper export theory is accepted then it may be presumed that there was exchange in tin. Only in-depth studies of those objects with trace elements and isotopic analyses can solve the enigma of it. The future analyses of copper bronze specimens of Agiabir will highlight the beginning of high tin bronze in Eastern India. Thus the finds of South-East Asia at least indicates the close contact with India but does not satisfactorily identifies that it originated at South-East Asia. So far Agiabir is concerned, presently this is the earliest site in eastern India in this context. Technologically, the analyzed specimen indicates the crude or better beginning of quenching techniques. Further analyses will highlight the intensities of it.

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Fig. 1. Photograph of knobbed vessels from Sarai Mohana



Fig. 2. Photograph of knobbed vessels from Sisupalgarh, after Lal 1948



Fig. 3. Photograph of knobbed vessels of Agiabır



Fig. 4. The SEM-EDAX photograph of the knobbed vessel of Agiabir

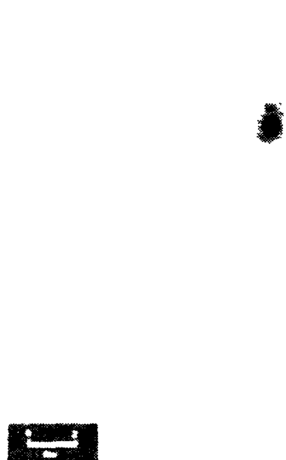


Fig. 5. Photograph of knobbed vessels of Wari-Bateshwar, Bateshwar Museum.



Fig. 6. Photograph of knobbed vessels from Chandraketugarh.

Secondary Jar Burial Practices in Manipur

Introduction

Manipur is a small State in north-eastern India. Archaeological research reveals that Manipur was inhabited since Stone Age which can be divided into three cultural phases viz., Palaeolithic, Hoabinhian and Neolithic. These cultural remains indicate close affinity to those of the South-east Asian countries (Singh, 1997a). Manipur is populated by the Mongoloid and Austroloid population (Singh, 2001b). Burial is one of the ways of disposing the dead in Manipur since very early days. The Meities in the ancient days practised various ways of disposing the dead: in an open space, immersing in a water body and burying in a burial ground of the respective clan.

Cremation was not common prior to the 18th century A.D. (Bheigya 1988 & Singh 1988). The Royal Chronicle of the Meiteis records the internment of the dead along with grave-goods comprising of gold, silver and bronze objects. The practice of secondary burial is also evident. It also records the building of a secondary burial mound for the king Charairongba in A.D. 1710. In A.D. 1724 Maharaja Garibniwaz collected the bones from the burials including those of his grand parents for cremating at the bank of Ningthi river (now in Myanmar); and since then cremation became a general practice among the Meiteis of Manipur (Singh & Singh 1968: 40,61,73,74). However, till date if a young child dies before the age of three years, is buried; new borns are be buried in a jar.

Burials of both primary and secondary nature were common among the tribal population in Manipur (Hodson 1974:146-151). But so far there is no evidence of jar burial among the tribal population of Manipur.

Archaeological Evidence

A few secondary jar burial sites have been unearthed recently from different parts of the Manipur Valley i.e., at Sekta, Khaidem m'ang, Panjaopalumching, Luwangching and Khangabok. The sites are described below:

Sekta

The site of Sekta is located on the left bank of Iril river at a distance of about 8 km towards north of Imphal. There are six burial mounds, and one of the mounds was excavated in 1991 (Sharma 1994) and 1994 (Singh 1997). The excavations reveal the practice of secondary jar burial. The exhumed skull and other bones are interred either in a single jar or otherwise together with grave-goods (Pl. 1). Each jar is covered by a lid, a plate or bowl or by broken half of a jar. The grave-goods vary from one burial to another and include small bronze bells, ear and finger rings, bracelets, armlets and bronze relic casket (Sharma 1994). However, beads are found in almost all the burials. The iron implements like spearheads and knives are found only in the later period (Singh 1997b). Other associated grave-goods are in different earthen wares comprising of bowls, small oblong round bottomed jars, ring-footed vases, spouted vessels, etc., besides a few painted porcelain wares. The earthen wares are decorated mostly by the impression of carved paddles in the herring bone design, ribbed, chevron and honey-comb patterns; by incised marks in the early period and very rarely with cord marks. One characteristic of the Sekta burials is the covering of the face and part of the skull by a thin copper plate, a mask - which is a unique practice (Sharma 1994, Singh 1997b). The antiquity of Sekta has been assigned by Sharma to a time bracket between 1st -

2nd century B.C. and A.D. 1st - 2nd century, but the author of the present study believes that the antiquity of Sekta dates to A.D. 12th-13th century, on the basis of a coin found in the 7th level of Sharma's excavation which also falls within this time. The association of Buddhist relic casket and the porcelain painted in the Buddhist pagoda style in the Sekta burial also suggests the contact of the Sekta people with the Buddhist culture, perhaps during the Tai migration in the 12th -13th century A.D. towards north-east India.

Khaidem m'ang

The site of Khaidem m'ang is located at a distance of 2 km towards southeast of Sugnu bazaar on a fan deposit extending from the western foothill of the Sokom Baite village, Chandel district of Manipur. The name of the site suggests that it was the burial ground of the Khaidem lineage of the Meiteis. In 1990 the author excavated a trial trench measuring 2 x 1 sqm. At a depth of 15 cm and 47 cm from the surface, eighteen burial jars covered by a lid were exposed (Pl. 2). Bone fragment pieces along with grave-goods comprising of iron scissors, barbed arrowhead and a ferrule, bronze bracelet, anklet, ear-and finger rings, large number of ancient Manipuri coins, and a glass mirror were interred in these jars. This indicates a secondary form of jar burial.

The burial jars are generally small and hand-made, the biggest one is 290 mm high with flattened body. The lids, which covered the jars, are either of a complete basin, bowl or part of the broken jar. The jars are decorated with the basket impressions of paddles, chevron and herring bone patterns, and rarely diamond pattern on the shoulder and double triangles on the body. These decoration patterns are still prevalent among the modern pottery in Manipur (Singh & Singh 1996). However, the carinated and flattened body basins, which are used as lids, are not made now-a-days. The basins are also hand-made and have grooves on the shoulder. The ring-footed bowl is plain, and this type is also still in use in Manipur.

The bell-metal coins form a significant item of the grave-goods. The coins bear the legends *'shri'* in Devangari; 'R', 'L', 'La', 'M', 'Ma' in Bengali/Assamese letters, and 'M' in ancient Meitei letter. A circular coin incused with 'peacock' was also included in one of the burial jars. From the association of these coins, the jar burial at Khaidem m'ang may be dated to the early 19th century A.D. (Singh, 2001a).

Panjao-palumching

It is a low hill situated on the right bank of the Sekmai River at a distance of about 2 km towards north-west of Kakching bazaar, Thoubal district. The site is on the hill slope. The top soil at the higher altitude has completely eroded, with the result the archaeological relics once buried have been exposed and washed down the slopes depositing at the foot-hill. The author dug a trial trench of 5'X5' square on the eastern slope and exposed a secondary jar burial (Pl. 3) being associated with different types of red wares and iron implements (A Report of the State Archaeology Department 1983). These red wares have globular body and include pots with long funnel-shaped neck, wide-open pedestal wares, deep and shallow bowls. One of the pots is faintly painted in solid triangles and dashes. Such faint painting technique is also evident from the primary burial at Moirang, Bishnupur district, which has been dated by ^{14}C method to A.D. 170 (Singh 1988:9). The iron implements consist of barbed darts, a barbed arrow head and a knife.

Luwangching

The site located at a distance of about 1 km towards west of National Highway no. 39 at Khonghampat, and is known as Luwangching. The name of the site indicates its relationship with the Luwang Ningthou, a village deity whose sacred place is also found at the nearby hill slope. It is a low hill extended part of the Koubru Hill range in the western side of Imphal valley. The slope of the flat ridge extending towards north is gradual and is about 100 feet high. It is from here the secondary jar burials have been dug up accidentally by the labourers of the Manipur Forest Department while digging the pits for saplings during the first week of June 1997. The peak commands the valley in tall directions and is a safe place for settlement. At the northern foot hill the Luwangli stream flows from west to east, and it turns towards south at a little distance away from the eastern foothill. The village of Khamaran is now located on the eastern bank of the stream.

Three trial trenches, one by the State Archaeology, Government of Manipur and two by the History Department of Manipur University, have been laid on the northern flat ridge during the third week of June 1997. The excavations exposed secondary jar burials. The exposed sections indicate only one burial layer at a depth of about two and a half feet. The jars were buried in shallow pits into the weathered rocky soil. In one of the trenches dug by the History Department there were found fragments of pots in the exposed sections, which indicate the interring of smaller urn inside round bottomed oblong jar which is again kept inside another big size similar jar. A few bone pieces were also found scattered on the bed-rock inside the trench, which seems to have been removed from the urns during the excavation. Bone pieces do not exhibit any sign of burning, however, the inner surfaces are black. S.B. Singh, Superintendent of Archaeology, believes. The grave goods inside the urn include beads, bracelets, armlets, finger-rings, iron knives and beaded darts. No spearhead has so far been unearthed. Other grave-goods include spouted vessels, narrow high-necked globular pots and some with flat bases. The pots are all hand made, a few bowls appear to be made by strip building technique, and include plain and impressed wares, and very rarely with incised decoration. One small porcelain bowl painted in blue is also included, which is used as lid for the urn. The impressed surfaces are in herring-bone and ribbed patterns. Internment of urns inside bigger jars is also evident towards the last phase of Sekta jar burial (Singh; 1997b).

Khangabok

It is the name of village named after the Khangabok, a group of people in Thoubal district of Manipur. Here the author first notice, the jar burial site in 1996. The local people had reported that the burial was exposed while levelling a school ground. Later in the same year the State Archaeology Department excavated the site and exposed a rich secondary jar burial (Indrani Devi, 1999). The skull and fractured bones of limbs and other parts are interred in a jar buried along with grave-goods. The grave-goods consist of rings (both of ear and finger) and miniature plates of bronze, iron knives, and various types of pottery The pottery includes incised and plain wares, however, the incised wares are very rare; and consist of ring footed bowls and pot with globular body. These globular pots have narrow necks which were used as liquid container.

Discussion and Conclusion

Jar burial culture is widely prevalent in India and South-east Asia during the later prehistoric times. In India both primary and secondary forms of jar burials were evident during the Chalcolithic period of the Deccan (Jain 1979). Jar burials are also reported from Eastern India. Urn containing fragmentary bones is also reported form Sonapur, Bihar and Pandu-rajar-Dhibi, West Bengal. But these urn burials are not similar to those from Manipur.

Both primary and secondary forms of burials were evident in Indonesia during the late prehistoric times (Glover 1979:179-80). Gilimanuk jar burial was the indication of human sacrifice that had been carried out in a few cases of deceased persons of prominent status (Soejono1979:196-97). R.B. Fox (1979:235) said that the various jar burial practices in Philippines during the Late Neolithic time to the present were the result of the immigration of people from different places at the different times, particularly from South mainland Asia. In Thailand jar burials dates back from the late prehistoric period to the 11th century A.D. At Mun and Chi valleys the jars ranging from two to ten in numbers are buried in groups. Human skull and long bones are interned in a jar, and alongside another jar containing grave-goods comprising of pottery vessels, glass beads, and bronze ornaments such as bells, rings and bracelets is buried with the first jar, making the burial composite in nature (Indrawooth 1997:149-151). This jar burial practice at Mun and Chi valleys is closely comparable with that of Manipur, particularly of the Sekta jar burials.

Jar burial practice in Manipur is so far evident only from the valley region. As stated above there is no report of the practice of jar burial among the tribal population. There is historical record that skull and bones are being washed after collecting from the primary burial and dried in the sun for five days before confining them in a jar as secondary burial. This is performed after the lapse of one year from the time of death (Singh, K.C. 1975:81-82). Till date the Meitei continues the practice of secondary burial in a modified form. A piece of bone collected during the cremation is buried near the cremation-ground

to be recollected with rituals after six days. Hindu's disposed the bone pieces after sometime by throwing it into the Ganges (Hodson 1975:117), or burying at a religious place like Vrindavan in Uttar Pradesh (India). Till about three decades ago, the Meiteis used earthen pots for cooking and when a death occurs in a family all the cooking pots of the families of the deceased lineage (Sagei) are either broken or kept at a corner outside the house. Finding of used pots and other mortuary gifts like iron scissors, ancient coins, etc., in association with some of these archaeological burial remains, particularly at Khaidem m'ang, in Manipur is a clear indication of the relation of these secondary burials with the present day Meitei population. It also seems that the burial practice by the Meitei continued longer at the peripheral area than the Imphal proper in the valley.

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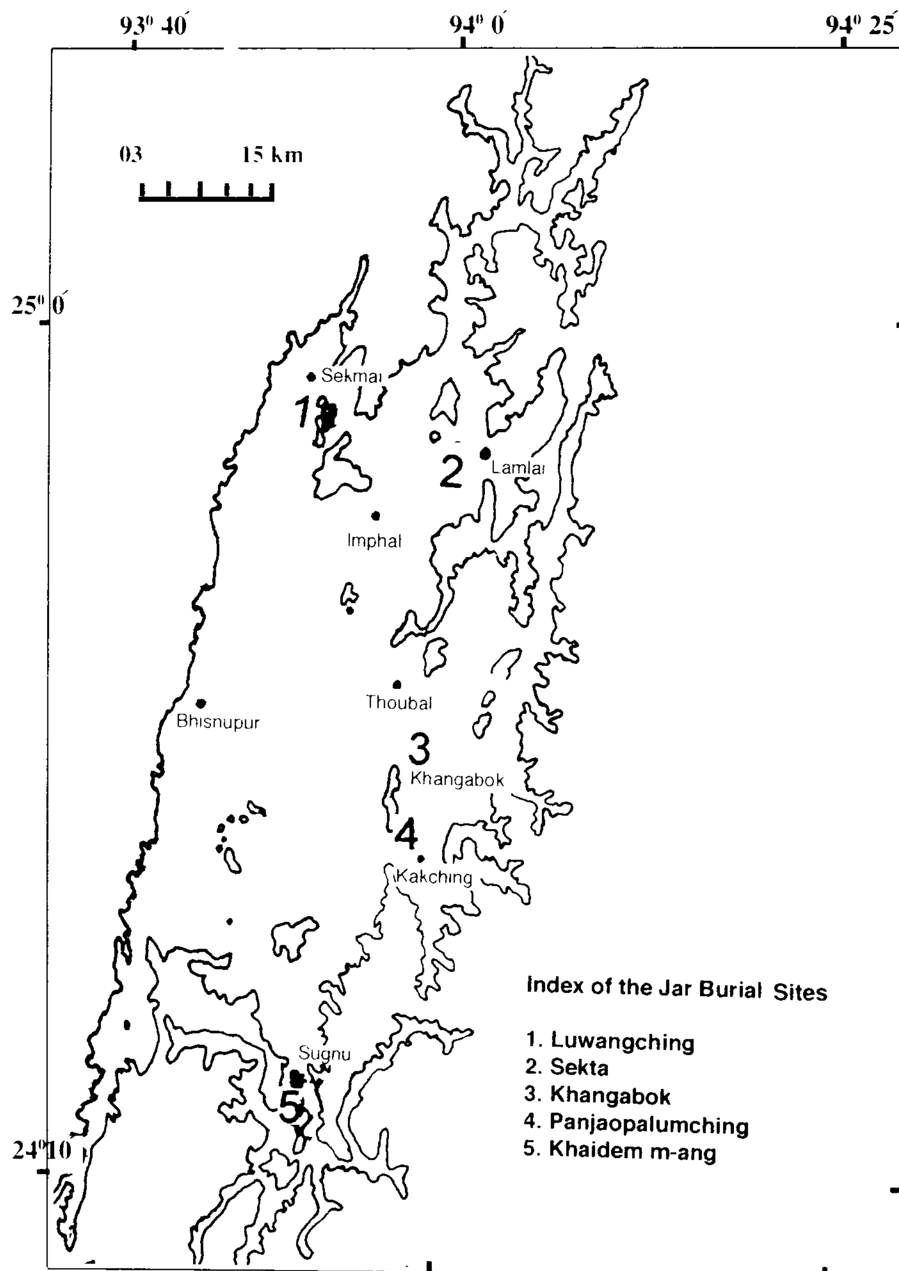
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Map Showing Jar Burial Sites in Manipur

Recent Archaeological Excavations in the Narmada Valley (Special Reference to Sardar Sarovar and Indira Sagar Projects)

1. KAVATHI

The Directorate of Archaeology, Archives and Museums, Madhya Pradesh conducted an archaeological excavation in the Sardar Sarovar submergence area at Kavathi in District Dhar under the supervision of Dr. Om Prakash Misra with Shri B.K.Lokhande, Nagendra Varma, L.P.Kadam and Hiralal Pal.

Kavathi is situated on the right bank of Narmada at a distance of 23 km from Manavar Tehsil headquarters. Five trenches were laid to know the cultural sequence.

Period I - Chalcolithic: The lowest deposit is of the Chalcolithic Period with the antiquarian remains like microliths and painted pottery. Microliths are made of chalcedony; the industry can be observed in the site with cores, unfinished tools and microliths comprising blades, lunates, borers and others. Total deposit was 10-15 cm in all the four trenches. Houses were traced with post-holes arranged in rectangular and circular forms. Painted Chalcolithic potteries bear designs viz., hanging loops, parallel lines, etc. Some sherds are of black-on-red ware and are with paintings in white and black.

Period II - Early Historic: We could not trace the regular deposit of the historic habitation due to the disturbed nature of the site. However, antiquarian remains proved that there was a habitation even in the historic period. These are beads of terracotta and stones, shell bangles, terracotta objects, toys, balls, etc.

Period III - Early Medieval Period: The Paramara sculpture and architectural fragments have been noticed in the village. A modern Siva temple was built by the local people with the support of ancient architectural remains.

There was a house of Ganguteli, who used to supply bangles in this area. A large number of shell and glass bangles have been reported from the site. On the basis of antiquarian remains and study material from Ekalwara and Katnera, excavated by the Department of Archaeology, Madhya Pradesh, we can imagine the habitation of the Chalcolithic people at Kavathi, as these sites are situated on this bank of river Narmada at a very close distance.

2. MARUCHICHLI

Excavations were conducted at Maruchichli in Barwani District. Maruchichli is situated at a distance of 9 km from Dabana (Dhamod-Barwani Road), a small town of Barwani District. The site is located on the left bank of Narmada.

This village is under submergence of Sardar Sarovar Irrigation Dam Project. The purpose of the excavation was to know the trade-route and cultural deposits.

The ancient mound is in ruined condition with antiquities littered on the surface. Eleven trenches were laid on the mound, measuring 5x7 m, 4x6 m, 5x6 m and 4x4 m.

Cultural Sequence: Maruchichli was the site where Chalcolithic people began habitation before the permanent settlement appeared at Adalpur Chichli. The site was first excavated by the Archaeological Survey of India, Nagpur Branch. The Chalcolithic pottery and

microliths have been reported from Trench No.1, with black cotton soil. Due to shortage of time and limited area of excavation we could not trace the details of the Chalcolithic habitation.

Trench No.1 measured 5x7 m and revealed deposit of 70 cm thickness in layer 1 and layer 2. From surface exploration and findings it may be surmised that the habitation was Chalcolithic in character. No other trench yielded antiquities or potteries of this culture.

As reported by the exploration team, the site was perhaps a business centre during the Mauryan period. The antiquities and related pottery like Northern Black Polished Ware and Black Slipped Ware proved the existence of the habitation of Mauryan times on the site for quite some time. Terracotta beads, semiprecious stone beads, pendants, earlobes, etc., were also reported from the Mauryan levels. We also found potteries and antiquities related to the Sunga period.

The base settlement at Maruchichli belonged to the Gupta period. The evidence was in the form of burnt floors, hearths, floor deposits, house pattern and related antiquities such as pottery, beads, terracotta figures, earlobes of terracotta and semiprecious stones. We found their deposit in all the trenches, except in Trench no.1 and IV.

The temple remains of the Paramara period have been reported from the village. Later the site was shifted to the modern village as we could trace some Sati memorial pillar remains belonging to the 16th-17th c. A.D.

Cultural Sequence at Maruchichli

Period I: Medieval period remains of Sati stones.
Period II. Historic period temple remains of the Paramara times.
Period III: Gupta period Pottery, terracottas, earlobes, beads, mother goddess figurines, stopper, beads and earlobes of semiprecious stones, shell bangle fragments, etc.
Period IV. Sunga period Janapadiya coins, pottery and other related antiquities, Black-and-red ware, slipped ware
Period V: Mauryan period NBP pottery, red slipped ware, black-and-red ware, shell bangles, terracotta figurines, etc.
Period VI: Chalcolithic period microliths.

3. CHHALPAKALA

Excavations were also conducted at Chhalpakala in District Khandwa. The site is situated at a distance of 3 km from Singaji Samadhi Sthala. Singaji is a place of religious importance in Nimar region. The nearest railway station from the site is Borkheda.

Chhalpakala is under the submergence of Indira Sagar Irrigation Dam Project. To know the cultural sequence, we excavated the mound. Four trenches, measuring 6x5 m, 5x4 m and 4x2 m were laid down, which showed an average cultural deposit of 2.20 m.

Cultural Sequence

Period I: Mauryan period
Peirod II: Sunga-Satavahana period.
Period III: Gupta-Kshatrapa period.
Period IV: Mughal-Maratha period.

Important Antiquities

Copper and antimony rods, iron arrowheads, terracotta skin rubbers, stone and terracotta balls, earlobes, iron nails, etc., have been the important finds. Some inscribed pot-sherds have also been found. One such inscription in early or Ashokan Brahmi, was 'Dhanam Tasya' which means that the bowl was used for donations.

The Sunga-Satavahana remains are in the form of burnt mud-floors with post-holes. Gupta-Kushana decorated pottery revealed the occupation in Gupta period. Also, Paramara stone sculptures, which are still available in the village, reveal the Paramara period occupation of the site.

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BOOK REVIEWS

D.P. Agarwal and J.S. Kharakwal, 2003, *Bronze and Iron Ages in South Asia (Archaeology of South Asia-II)*, Aryan Books International, New Delhi, pp. xx+322. 40 figures and maps, 29 tables, plates: col.14; b/w 60. Price Rs. 2600/- (Hard bound).

There was a constant need for an upgraded source book on the archaeological scenario in India, which has been fulfilled by a series named Archaeology of South Asia by present authors. This book comprises the second part of the series, the first one being *South Asian Prehistory* (Agarwal & Kharakwal 2002). The present volume incorporates the latest results of research on Indus Valley Civilization and other cultures of Bronze and Iron Ages.

The book has been divided into seven chapters of which chapter one being the introduction outlines the framework of the book and gives a brief account of all the succeeding chapters.

In the second chapter the authors have provided data regarding multidisciplinary studies towards reconstruction of past environment and climate. Discussion on the environmental changes in the geological framework and its impact on the civilizational processes, is one of the important thrust areas of this chapter.

Third chapter of the book elucidates the Indus Civilization in detail supported by the latest research materials highlighting origin, regional variations, craft specialization, trade, religion, burials, script of this culture followed by a discussion on the late phase. This chapter also takes into account some of the important Harappan towns.

Chapter four is devoted to all the non-urban rural Chalcolithic cultures such as Ganeshwar-Jodhpura, Ahar or Banas, Anarta, Malwa, Savalda, Jorwe, Black-and-Red Ware of the Ganga valley and Copper Hoard People.

Chapter five discusses Iron Age cultures of South Asia. It has been further divided into two sections. The first part incorporates description of various Iron Age cultures, e.g Gandhara Grave, PGW, Megalithic and NBPW cultures, providing data on the distribution, typology, ceramic industries, subsistence pattern, art, origin, chronology, tools, etc. Significant aspect of the second section is the discussion on iron technology and ethnographic studies and early iron from Bronze Age sites.

Chapter six explores the central Himalayas, which appear to have played an important role in the expansion of agriculture and metal technology. The concluding chapter summarizes the evidences and points towards the lacunae to be filled and the new directions of research.

The book is really useful to the students of Archaeology as it provides a concise data on the cultural milieu of Bronze and Iron Ages in South Asia.

Sandeep Kumar Rai

Gautam Sengupta and Sheena Panja (Ed.), 2002. *Archaeology of Eastern India New Perspectives.* Centre for Archaeological Studies and Training, Eastern India, Kolkata, pp 623. Price Rs 600/-

The book under review includes contributions of 25 scholars under five broad headings relating to the archaeology of Eastern India and also Bangladesh, which is an integral part of South Asia. The foreward is in the form of introduction and reviews of articles. The editors have clearly mentioned that archaeology has always been a neglected discipline in Eastern India and Bangladesh and there was a complete lack of multidisciplinary approach in this area.

The book opens with the Early historical terracottas, pottery and chronological sequence of West Bengal whereas, the next section deals with the microlithic of western Plateau and prehistoric sites of western Garo hills of Meghalaya including sites of Sisupalgarh, Chilka Lake, Ajay river valley and Chanderketugarh. The archaeology of Bogra District in Bangladesh has also been included. The role of ethnographic work in the form of living megaliths from Manipur and study of terracotta objects and its relevance has also been highlighted. A separate section has been devoted to some current works in archaeological science dealing with monuments and pottery technology, which gives a detailed picture of inside mechanism.

The last section deals with the archaeological explorations and excavations in West Bengal and some observations on Samatata, Mainamati in Bangladesh. The editors deserve to be commended for bringing out this volume having a unifying theme. It is a welcome addition and a timely one to the growing number of studies on South Asian Archaeology. The book is recommended both to the specialists and students of archaeology.

K.N. Dikshit

Purshottam Singh and Ashok Kumar Singh, 2004 *The Archaeology of Middle Ganga Plain: New Perspectives (Excavations at Agiabir).* Indian Institute of Advanced Studies, Simla, Aryan Books International, New Delhi, pp 93, figures and maps 22, plates 33. Price Rs 750/- (Hard bound).

This book mainly focuses on the summary of the results of a limited excavation carried out at Agiabir and also analyses the progress made in the sphere of archaeology particularly of the Middle Ganga Valley till date.

It has been divided into six chapters and at the outset in the first chapter of this book the authors have given a brief and updated records of the geomorphology of the Middle Ganga Valley along with its cultural sequence, which is supported by radiocarbon dates.

In the second chapter an attempt has been made to provide the results of limited excavations at Agiabir, located in Mirzapur district of eastern Uttar Pradesh, where cultural deposits range form Narhan Culture (1300 B.C.) to Post-Gupta Period. The excavations yielded limited number of copper objects but the site was rich in iron antiquities mostly from NBPW phase.

In succeeding chapters (chapter 3-5) the authors have tried to present a comprehensive study of various metal objects, seals and sealings and other antiquities recovered from this site along with chemical composition of various antiquities.

Chapter 6 is the Epilogue in which the authors have given a careful analysis of the ceramic industries and other antiquities recovered from Agiabir supported by comparative archaeological data from other excavated

sites of Middle Ganga Valley. This is an important chapter, which presents the summary of study in a nutshell.

This book is useful to the scholars dealing with the archaeology of Middle Ganga Plain as it provides an insight into the early development of iron technology in India as well as growth of cities during second urbanization in the Ganga valley.

Sandeep Kumar Rai

Yoshinori Yasuda and Vasant Shinde, 2004. *Monsoon and Civilization*. International Research Centre for Japanese Studies, Kyoto, Japan, Roli Books Pvt. Ltd., New Delhi, pp. 440. Price not mentioned

This excellently produced book contains 25 chapters divisible into five parts and opens with an introduction by Yoshinori Yasuda on discovery of riverine civilizations in Monsoon Asia which was ideal for growth of forests. To its west lies arid Asia, which consists mainly of deserts and grasslands unsuitable for agriculture. In the end is a list of contributors and an index.

Part I embodies four extremely well researched Asian Monsoon papers on variability and human adaptations from Hanggai mountains in Central Mongolia and China including radiocarbon dating of an ancient bridge in Xiangyang, whereas Part II has nine papers devoted to India, especially on prehistoric cultures in Thar desert and Holocene adaptations of the Mesolithic and Chalcolithic settlements in Gujarat and a solitary article on Nile floods. Part III has four papers dealing with Holocene climate history and the regional diversity of Harappan civilization in Gujarat and Part IV deals with Monsoon and Civilizations having three articles effecting religious, social and economic history.

Last part (Part V) consists of three papers pertaining to climate and civilizations with a case study of rise and fall of Peruvian civilization and also a study of Western India between 5th and 3rd millennium B.C. The articles in the volume are on global climatic changes during the Pleistocene and Holocene and humans responses and also includes results of interdisciplinary and integrated research in reconstructing past climate sequences. The major concern of the volume is on the micro-study of the ancient civilization, which developed, in deep Monsoon Asia - the rice cultivating - fishing civilization. It centred upon summer crops of rice and millet such as foxtail millet (Setaria) that grew in an environment of wet forestland. The volume under review is an effort in that direction.

Editors deserve to be congratulated, as the volume is excellent in material and production with maps and plates. This should be compulsorily read by all - whether specialists or students-interested in acquiring an insight into the archaeology of Monsoon Asia.

K.N. Dikshit

Vidula Jayaswal, 2001. *Royal Temples of Gupta Period - Excavations at Bhitari*. Aryan Books International, New Delhi, pp. xii+220, figs. & maps 69, plates 31. Price Rs. 1950/-

This report is the outcome of archaeological investigations at Bhitari (District Ghazipur, Uttar Pradesh), which were carried out by the Department of Ancient History, Culture and Archaeology, Banaras Hindu University, between the years 1968 and 1973, and 1995.

Though many sites have been excavated in the Ganga plains, a distinct Gupta period is seldom represented. This has raised a number of historical issues, which at times even questions the relevance of the label ëGolden Ageí for the Gupta Period. As the author mentions, Bhitari excavations would fulfil this lacuna. Since Bhitari is single culture site, which contain three unearthed brick temples, parts of residential localities and a tall free standing pillar bearing an inscriptions of Skandagupta besides antiquities. Such excavated remains here provide base for determining the main techno-culture characteristics of Gupta period.

This monograph is divided into eight chapters, comprising Introduction chapter which deals with the genealogy of Gupta kings and details of temples built under their direct or indirect patronage. The second

chapter Land and People includes geographical setting of Bhitari along with adjacent Ghazipur region and material resources of building material, which were exposed during the course of excavation. The third chapter History of Archaeological Investigations deals with the Bhitari Pillar: the first clue for the identification of this place as ancient remains and the Sanskrit contents of inscription along with English translation. Besides, this chapter also gives the result of excavation conducted in the years 1968-73 and 1994-95. The chapters four to six deal with the Excavation of Temple No. 1, 2 and 3 separately whereas, chapter seven included underground structures too. The last chapter discusses the summary and deductions give report.

The early historical site Bhitari is important for many reasons. This is the place where Huns and Gupta king Skandagupta fought and ultimately the latter won the war and continued the temple construction which was left unfinished by his father Kumaragupta I. The diggings also amply prove the different phases or stages of temple construction. During the period of Skandagupta not only the size of the temple increased, but the entire plan was reconstituted. Moreover, some of the earlier structures of the foundation were utilized in the second stage also.

Following the famous Allahabad pillar inscription of Skandagupta, Bhitari is the other one which mentions in detail the military, political and cultural achievements of the Gupta imperial family. Unlike the other temples of Gupta period, which were basically built by the feudatories of the Gupta kings, these unique groups of temples were constructed by the Royal Gupta Kumaragupta I and Skandagupta themselves. While most of the Gupta temples known to us are the monuments standing above the ground, in this case, however, foundation and the lower part of the shrine were retrieved. These temples were massive and elaborate and reflect affluence.

The exposed habitational remains are regarded as good example to understand temple-based settlements of the Gupta period.

Bhitari, being a first Gupta site, to be excavated horizontally, the report is not only important for bringing out the new elements of the royal temples of the Guptas, but also significant because of elaborate material culture such as pottery, terracotta, other daily utility items which help to identify the culture of Gupta period. The book is well documented with maps, figures and plates.

T. Arun Raj

Sadasiba Pradhan, 2001. *Rock Art In Orissa*. Aryan Books International, New Delhi, pp. xvii+84, figs. 23, maps 4. Price Rs.950/-

This book on Rock Art of Orissa is the first of its kind on the subject as far as archaeological research in Orissa is concerned. Here the author gives an overview of rock art research and rock art study in India. The second chapter 'Orissa: The land and the People' which talks about environment and ecology of the state. Chapter 3 'Orissa: A Cultural Profile' deals with chrono-cultural sequence from Prehistoric period to Historic period. The fourth chapter 'Rock art on Orissa' gives details about the painting and engraving, etc. Chapter 5, 'Ethnoarchaeology of rock' shows an attempt how ethnographic information on the execution of art obtained from primitive tribal societies can be used in the assemblage of rock art. For the ethnographic study, the author has chosen many examples from two important tribes of Orissa famous for their rich heritage in paintings and engraving respectively. The last chapter 'Conclusion' discusses the short-comings in the study of Rock Art of Orissa in the absence of any absolute date for these rock pictures, the difficulties to trace their origin and developments and the controversy of motivation behind this art.

In this report as many as 55 rock shelters distributed in seven districts of the western part of Orissa which contains 5,775 rock pictures and mostly explored by the author himself have been highlighted. The documentation brings to limelight the unique trait of pictographs being complementary to petroglyphs, a rare phenomenon not found anywhere in India.

The book reveals the potential of Orissa in the realm of rock art study and will be useful to the students, teachers and researchers who wish to pursue further studies in this aspect.

Illustrations in the form of colour photographs, maps and tables helps to understand the subject better.

T. Arun Raj

Man Mohan Kumar (ed.), *Numismatic Studies*, Vols. 5, 6 and 7. Harman Publishing House, New Delhi. Price, Rs. 400/-; Rs. 400/- and Rs. 700/- respectively.

For several years now, Dr. ManMohan Kumar of the Rohtak University, Haryana, has been editing the volumes of the *Numismatic Studies*. All the volumes received by the Society contain articles on coins found at several sites in India belonging to different periods of time, from Pre-Mauryan period. They serve as the source-books for the history of India. Through the Medieval period. All the publications are very well illustrated.

S.P. Gupta

Bimal Bandyopadhyay, *Buddhist Centre of Orissa*, Sundeep Prakashan, New Delhi. pp. 100+xii, with 59 Colour and B&W plates, line drawings, Bibliography and Index. Price Rs. 1500/-

The book, by one India's eminent art historians, presents the excavated remains from as many as three major Buddhist sites of Orissa : Lalitgiri, Ratnagiri and Udayagiri. It includes not only the remains of stupas and monasteries; but also sculptures, both stone and bronze, relic caskets and plans of structural remains. It is indeed a major contribution to the study of Indian Art and Architecture of the Medieval period. It is in a way a source-book for the researchers who had to go through many publications for much of this information.

The book has been beautifully printed and produced although the price is a little on the higher side.

S.P. Gupta

Devendra Handa, *Buddhist Remains from Haryana*, Sundeep Prakashan, New Delhi. pp.98+ XVI, with 51 Black-and-white plates, Bibliography and Index. Price Rs. 1500/-

The book, written by India's leading art historian, Dr. Handa, is comprehensive on a subject which dispels the common perception that Haryana has very little left to see in terms of art historical remains. The scholar has given the history of Kuru Janapada which is now Haryana. He then presents the photographs of the archaeological remains of early stupas, the fragments of Mauryan pillars, some fixed in mosques, Railing pillars of the Sunga Period, such as those from Amin, Hathir and Bhadas. The Saka-Kushan sculptures also find their due place in it. The Gupta and Harsha period sculptures in stone and terracotta are also presented here in beautiful photographs. The sculptures of the Medieval period are also here. Thus, one gets a complete picture of the art history of Haryana.

The book has been beautifully printed and produced. Everyone stands to gain from it, although we wish it was cheaper in price.

S.P. Gupta

Tanzim Raza Qureshi, *A History of Events*. Genealogy and Comparing tables of Muslim and Christian Chronology, Islamic Wonders Bureau, New Delhi. 214+8 Price: Rs. 1100/-

It is indeed a very rare book which contains in just 200 pages mines of information for which years require to compile. Shri Qureshi has done a great service to the cause of history and archaeology of the entire Asia and Europe. It contains rarest of the rare photographs, charts, calculations, etc. of the Indian, Mongol and Christian rulers and dynasties whose history conditioned the directions in which the history and culture of Eurasia moved and destinities of various nations got moulded. It is indeed amazing. Every researcher and interested lay man is bound to benefit from this book.

S.P. Gupta

REPORT OF THE XXXVII ANNUAL CONFERENCE

Report of the XXXVII Annual Conference of Indian Archaeological Society held at the Department of Anthropology, Sri Venkateswara University, Tirupati, Andhra Pradesh, from19th -22nd December 2003.

The Annual Conference of the three societies namely Indian Archaeological Society, Indian Society for Prehistoric and Quaternary Studies and Indian History and Culture Society, was inaugurated by Prof. P. Murali, Vice Chancellor, S.V. University on the 19th of December 2003 at department of Anthropology, Sri Venkateswara University, Tirupati.

Friday, 19.12.03

Morning Session

Seminar on Coastal Archaeology in India: Problems and Prospects.

The Theme of the seminar of the Indian Archaeological Society was introduced by Dr. S.P.Gupta and K.N. Dikshit. A number of archaeologists participated in the discussion. Ms. Rukshana Nanji and Dr. Abhijit Dhandekar presented a paper Pottery from Sanjan : Results of the excavation of the second season, whereas Dr. Gupta also spoke on the Preliminary Report on the second seasons excavation at Sanjan. Other papers included for this seminar were by V. Selvakumar, N.V. Nair & P.K. Gopi, on Excavations of a Sailboat at Kadakkarapalla, Alapuzha, Keralaî, and another paper by Sundaresh on Underwater Investigations off Mahabalipuram, Tamil Nadu. Dr. Sila Tripathi submitted a paper on the Maritime History of Andhra Pradesh and Prospects for Marine Archaeological Researchî. Dr. C. Margbandhu presented a paper on ìRoman Influence on the Art of Clay Modelling of Satavahana ñ A Study in Cultural Fusion.

Afternoon Session

Saturday, 20.12.03

Morning Session :

Danino, Michael
The Horse in the Indus-Saraswati Civilization.

Kalyan Raman, S.
Saraswati Hieroglyphs.

Malla, Mala
Nepal's Metal works and Casting Technology.

Suresh, K.M. and Somasekar, S.Y.
Recent Discovery of Megalithic Sites in Chitradurga district, Karnataka.

Misra, M.K.
Painted Gray ware Culture in Kheri district of Uttar Pradesh.

Chowdhury, K. Sandeep
Explorations in Kaimganj tehsil of Farrukhabad district, U.P.

Gopinath, Sujatha
Situating the Iron Age in South Indian Archaeology.

Sahi, M.D.N.
Coastal Gujarat and Maritime Trade with Western Asia in Fourth Millennium B.C.

Afternoon Session :

Manuel, J.
Rhinoceros in India: Evidences from Fossil Bones and Art.

Raj, Arun
A few Observations on Korkai (Tamil Nadu) and Mantai(Sri Lanka)-Two Ancient Ports in Mannar Gulf Region.

Sharma ,R.P.
Urbanization in Rajasthan with reference to Temple Town of Rajorgarh / Paranagar. A Case Study.

Tewari, D.P.
Excavations at Madanapur, Shahjahanpur district, Uttar Pradesh.

Nanji, Rukshana and Abhijeet Dandekar
Pottery from Sanjan: Results from the excavations of the second season.

Naulakha, S. J.
Archaeology of Aligarh district: A Review.

Dhania, S. Dhanpat
Harappan Mystery Deciphered.

Sunday, 21.12.03

Morning Session

Singh, Girish Chandra
Sculptural Art of Mathura, U.P. –An Introduction.

Rajendra, P.
Metallurgical Studies on Gold, Copper and Iron Artifacts from Megalithic Sites in Kerala.

Mohanty, R.K. et al.
Two Seasons of Early Historic Excavations at Mahurjhari and its Importance as a Lapidary Center., 2001-2003.

Nagaraju, S.
Excavations at Barakur 2002-2003: A Report.

Singh, K. Ashok
Agiabir: Chalcolithic Settlement of Middle Ganga plain.

Dikshit, K.N.
Antiquity of Ayodhya.

Afternoon Session

Shrivastava, K. Rakesh
Chalcolithic Ceramics of Saryupar Region with Special Reference to Lahuradeva.

Jain, Suman
The Indo-Greek Names –A Numismatic and Epigraphical Study.

Ramjit
History and Archaeology of Dishes/Bowl-on-Stand.

Mishra, Anoop and U.P. Arora
Further excavations at Abhaipur near Bareilly.

Sathe, Vijay
A Report on the Collections of Dr. A.P.Khatri, housed in the Indraprastha Museum of Art And Archaeology, New Delhi.

Gupta, S.P. et al.
A Preliminary Report of the Second seasons excavations at Sanjan.

Monday, 22.12.03

Morning Session

Singh, K. Arun
Recent discoveries of Kuninda coins from Satluj Valley of Himachal Pradesh.

Deo, Fanandam,
History of Interaction between Tribal People and their Socio-Cultural Environment in Western Orissa.

Padhy, P.K.
Development of Shakti Cult in Orissa.

Baruah, Punya
Colourful Cultural Heritage and Landmarks of History and Archaeology of Assam.

Baruah, Punya and Aditi Dutta
Judicial administration of Ancient Assam.

The closing function was held on the 22nd December 2003 and Prof .T. Siddaiah, Registrar, S.V University, gave the valedictory address. Jacob S. Jayaraj, Organising Secretary of the Conference gave the vote of thanks to the colleagues and delegates.

K. N. Dikshit
General Secretary
Indian Archaeological Society

B-17, Qutab Institutional Area,
New Delhi-110 016

THE INDIAN ARCHAEOLOGICAL SOCIETY

BALANCE SHEET AS ON 31.03.2004

LIABILITIES		AMOUNT (RS.)	ASSETS	AMOUNT (RS.)
Capital Fund	3216951.47		Fixed Assets	
Add L M.Fees	51500.00		(As per Annexure 'A' Attached)	13,997,204.00
Add : Grant utilised for fixed Assets	462864.00		(As per Annexure 'B' Attached)	462,864.00
Add:- Excess of Income over Expenditure	283559.52	**4014874.99**		
Corpus Fund		1,688,000.00		
Building Fund		8,858,263.00		
Lecture Fund- Dr.Y.D.Sharma		200,000.00		
Dr. A.K.Narain Award Fund		50,000.00		
Donation For Cupboards		16,080.00		
Donation for Podium		25,000.00	Current Assets and Investments	
Donation for Books		15,828.00	Fixed Deposit	2,509,208.00
Sri Gurudeva Ranade Award Fund		200,000.00	Govt of India 8% Bonds	400,000.00
			D G.A.S.I.- Security Deposity-Kamrej	10,000.00
Project Fund			BSES Rajdhani Power Ltd.(Deposits)	86,886.00
(As per Annexure attached)		469,761.80		
			Sundry Debtors and Advances	69,700.00
Securities			(As per list attached)	
India Infrastructure Pub.Pvt. Ltd.		270,675.00		
Loans & Advances			**Cash & Bank Balance**	
Dr. S.P.Gupta - Loan		400,000.00	S.B.I. - S.B. A/c 45062	53,999.01
Akhil Bhartiya Itihas Sankalan Yojna		450,000.00	S.B.I. - S.B. A/c 45082	35,625.07
Bharat Sanskriti Parishad		1,500,000.00	Indian Bank - S.B. A/c 460017	770,366.80
Sundry Creditors		239,468.27	Cash in Hand	2,098.18
		18,397,951.06		**18,397,951.06**

Sd/
(General Secretary)

Sd/
(Treasurer)

In terms of our Audit Report of even date attached.
for RAJAN SHARMA & ASSOCIATES
CHARTERED ACCOUNTANTS

Place :- New Delhi
Dated :- 12 10 2004

(Rajan Kumar Sharma)
Prop , M. No 84457

THE INDIAN ARCHAEOLOGICAL SOCIETY

INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31.03.2004

PARTICULARS	AMOUNTS (RS.)	PARTICULARS		AMOUNTS (RS.)
To Honorarium	698,226.00	By Grant ASI (Non-Plan)		
To Car Insurance	9,689.00	Received during the year	1000000.00	
To News Paper &Periodicals	2,335.00	Less : Transf. to Capital Fund	462864.00	537,136.00
To Telephone Expenses	63,323.00	By Grant for Publication		25,000.00
To Conveyance & Travelling	61,002.00	By Grant for Publication-32		50,000.00
To Printing &Stationery	27,161.70	By Grant for Seminar		85,000.00
To Electricity & Water Charges	66,377.00	By Interest Received		229,330.91
To Establishment Expenses	11,612.00	By Rent		1,002,634.00
To Conference Expenses	104,601.35	By Sale of Publication		108,485.00
To Computer Repair & Maintenance	34,855.00			
To Repairs & Maintenance	35,623.00			
To Car Running & Maintenance	36,250.00			
To Hospitality Charges	7,432.00			
To Postage, Courier & Stamps Charges	38,305.00			
To Internet Charges	5,000.00			
To Generator Running & Maint.	22,950.00			
To Bank Charges	2,467.50			
To Membership Fees	18,600.00			
To Commission	22,000.00			
To Consultancy Charges	20,000.00			
To Legal Charges	23,000.00			
To Ground Rent-D.D.A.	11,500.00			
To Professional Charges	44,500.00			
To Forensic Lab Museum Project	6,940.00			
To Publication Expenses	122,726.00			
To Audit Fees	26,000.00			
To Projects Expenses	81,200.84			
To Depreciation	150,350.00			
To Excess of Income over Expenditure	283,559.52			
	2,037,585.91			**2,037,585.91**

Sd/
(General Secretary)

Sd/
(Treasurer)

In terms of our Audit Report of even date attached.
for RAJAN SHARMA & ASSOCIATES
CHARTERED ACCOUNTANTS

Place - New Delhi
Dated - 12.10.2004

(Rajan Kumar Sharma)
Prop., M. No.84457

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INDIAN ARCHAEOLOGICAL SOCIETY
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E-Mail: ias_new delhi@yahoo.co.uk
K.N. Dikshit: 26948971
K.S. Ramachandran: 26955209

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Headquarter

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CM

Rao, Pl. 1, Bhirrana Inscribed Harappan celt



CM

Rao, Pl. 2, Bhirrana Inscribed Harappan celt





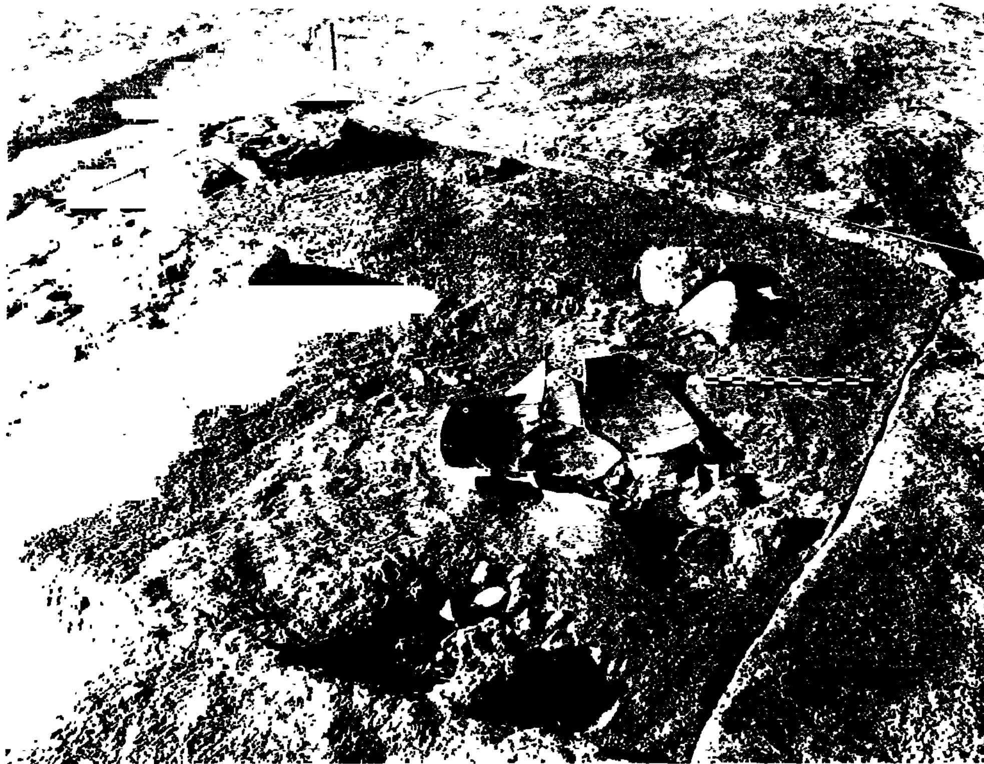






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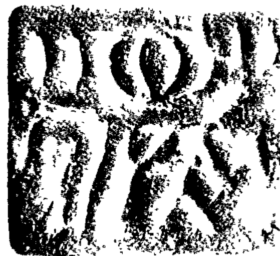
Rao, Pl. 3, Bhirrana: Harappan Seals



Trivedi *et al.*, **Pl. 1**, Tarkhanewala Dera: Burial ground, Harappan period (after A. Ghosh)

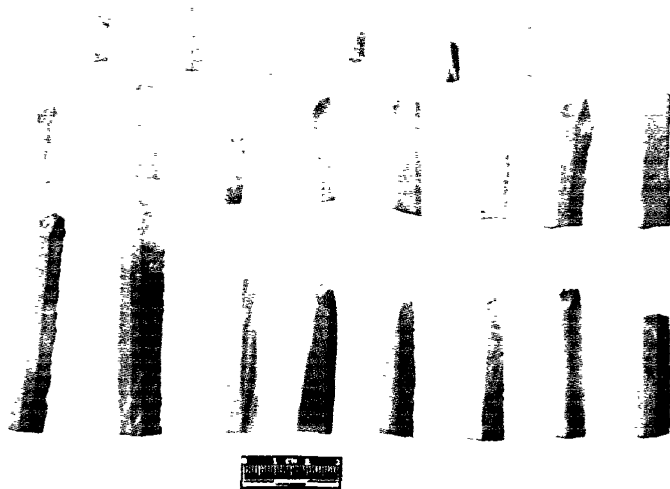


Trivedi ***et al.*****, Pl. 2**, Tarkhanewala Dera: Seal impression on Terracotta lump, Harappan Period





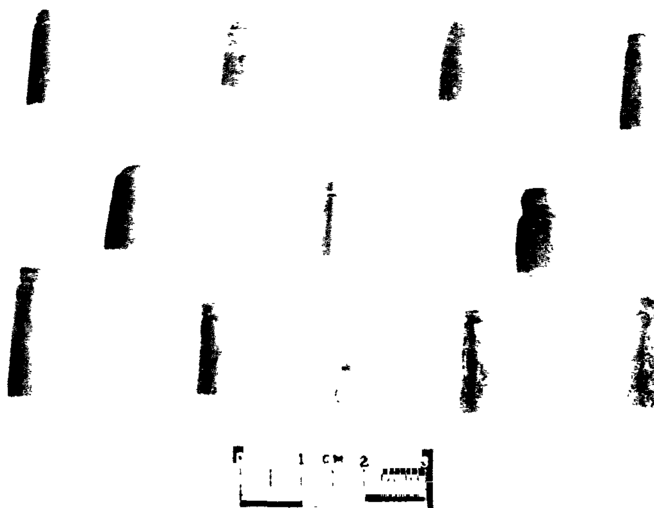
Trivedi ***et al.*****, Pl. 3**, Tarkhanewala Dera: Rectangular seal, Harappan period



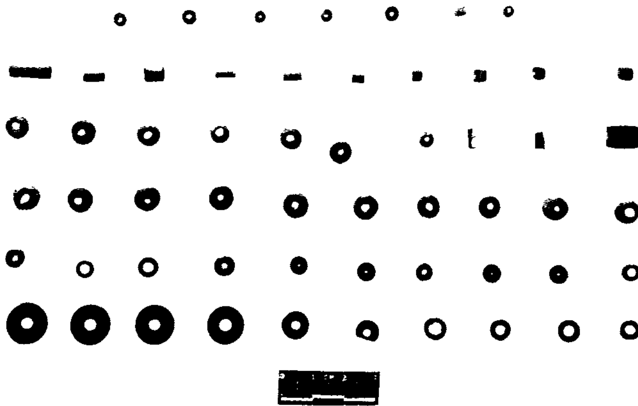
Trivedi *et al.*, Pl. 5, Tarkhanewala Dera: Chert blades, Harappan period



Trivedi *et al.*, Pl. 4, Tarkhanewala Dera: Terracotta human Figurine, Harappan period



Trivedi *et al.*, Pl. 6, Tarkhanewala Dera: Amulets in serpentine material, Harappan period



Trivedi *et al.*, Pl. 7, Tarkhanewala Dera: Steatite beads, Harappan period



Trivedi *et al.*, Pl. 8, Tarkhanewala Dera: Agate beads, Harappan period

Trivedi *et al.*, Pl. 9, Tarkhanewala Dera: Copper spearhead, Harappan period

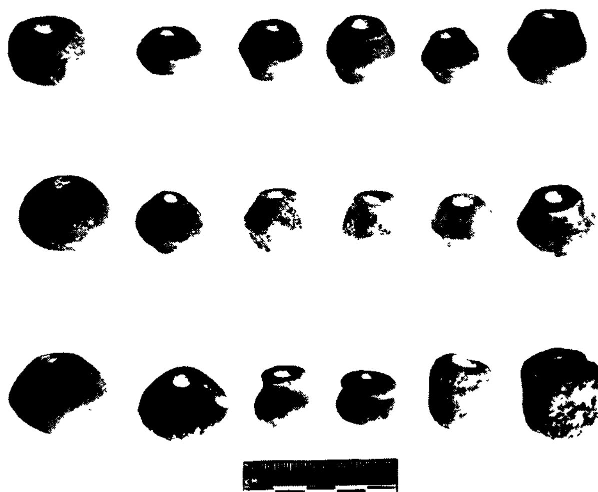




Trivedi *et al.*, Pl. 10, Tarkhanewala Dera Copper objects, Harappan period



Trivedi *et al.*, Pl. 11, Chak 86 Terracotta animal figurines, PGW period



Trivedi *et al.*, Pl. 12, Chak 86 Terracotta beads, PGW period



Pramanik, Pl. 1, Juni Kuran Painted sherds



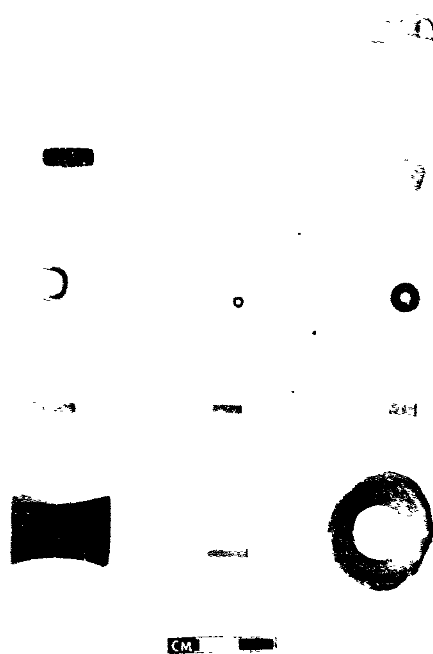
Pramanik, Pl. 2, Juni Kuran General view of stadium No. 1 and Gateway



Pramanik, Pl. 3, Juni Kuran: Details showing Gateway No. 2

Pramanik, Pl. 4, Juni Kuran Close-up view showing Gateway No 1

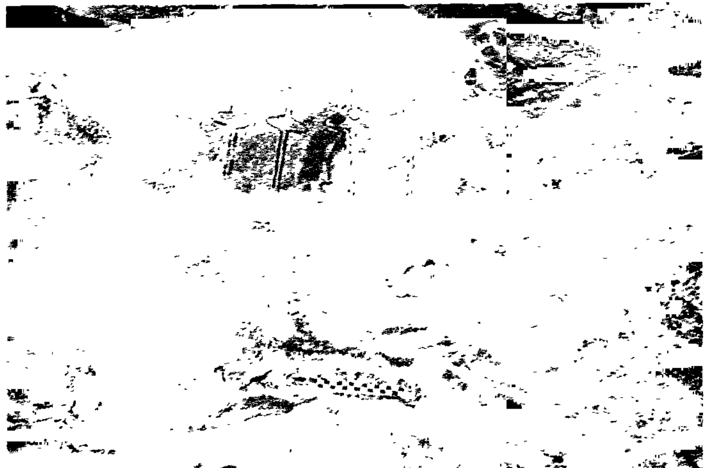




Pramanik, Pl. 5, Juni Kuran: Beads



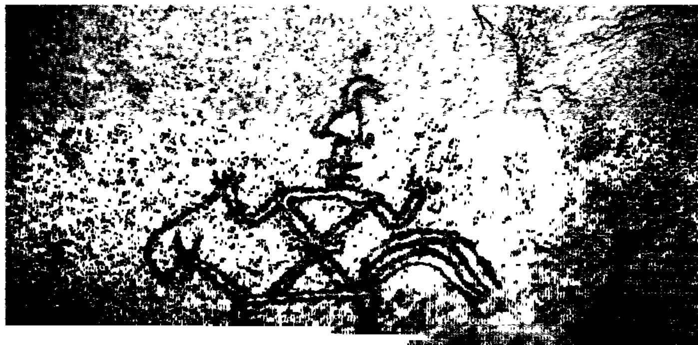
Prasad, Pl. 1, Ritualistic hunting and dancing around geometric symbols



Prasad, Pl. 2, Symbols and figures in yellow, white and red colours



Prasad, Pl. 3, Rajabar Humped bulls engraved on a rock boulder



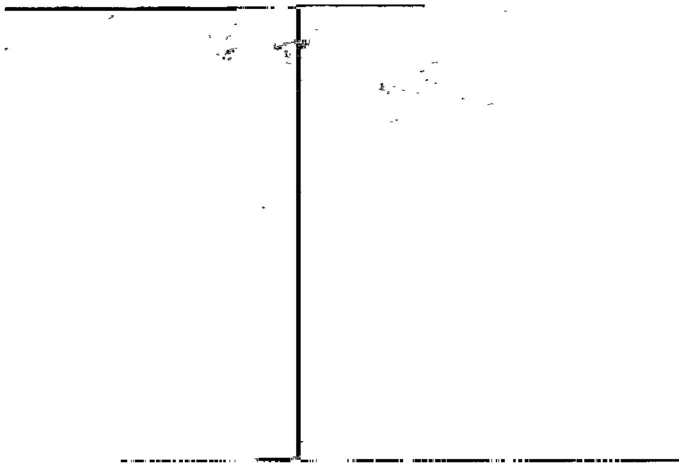
Prasad, Pl. 4, Ranigadar: Triangular human figurines and horse



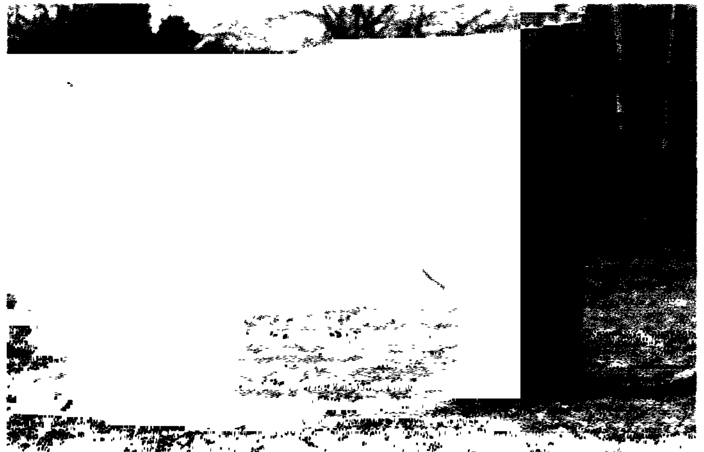
Prasad, Pl. 5, Jogia Hill Figures of horses, plants and sun, Gupta period



Prasad, Pl. 6, Palaeolithic tools found in rock shelters



Prasad, Pl. 6a, Megaliths in Dania



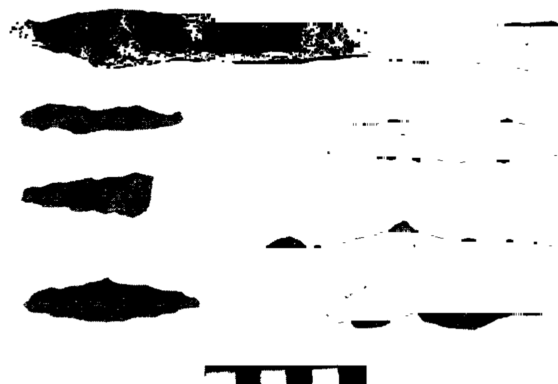
Prasad, Pl. 7, Shelter-pattern containing cupules with shining surface



Prasad, Pl. 8, Kharoshti inscription on the rim of the circle datable to 2[nd]C AD



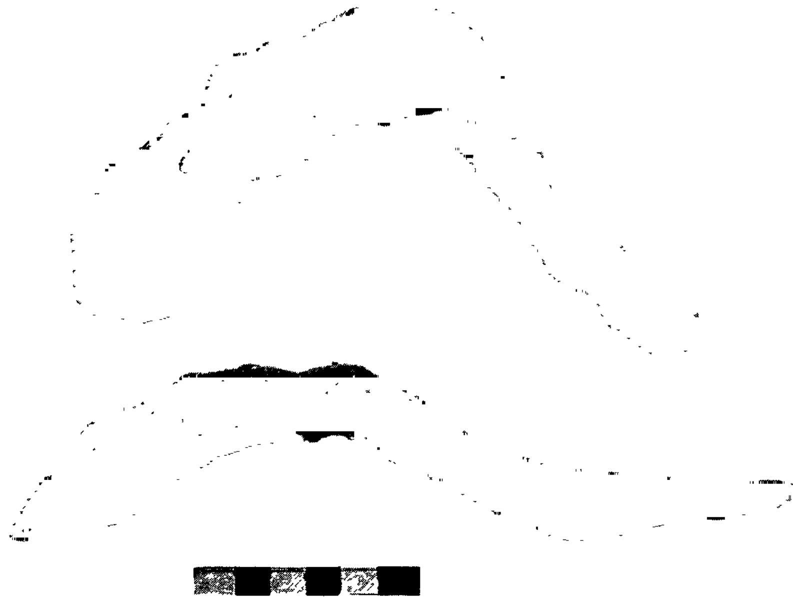
Kumaran ***et al.*****, Pl. 1,** Hathab iron nails



Kumaran ***et al.*****, Pl. 2,** Hathab. iron chisles



Kumaran ***et al.*****, Pl. 3,** Hathab iron knives and axe



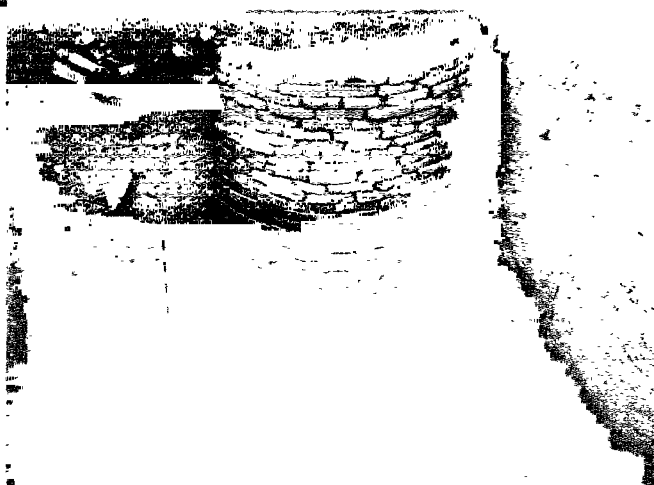
Kumaran *et al.*, Pl. 4, Hathab. ıron sıckles



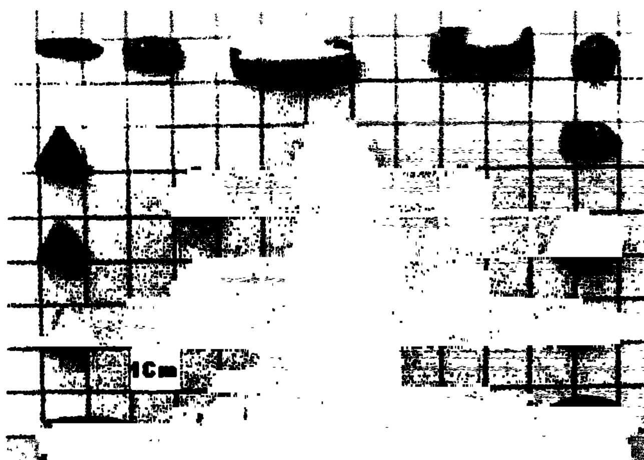
Kumaran *et al.*, Pl. 5, Hathab ıron chopper



Mani, Pl. 1, Siswania: Terracotta plaques



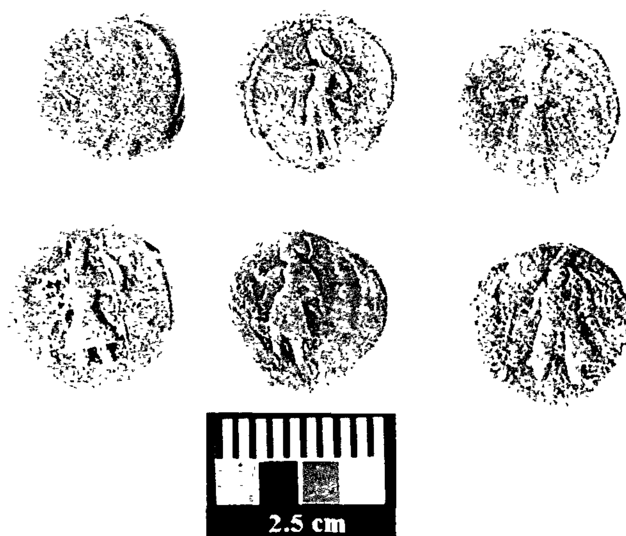
Mani, Pl. 2, Siswania: Brick well



Mani, Pl. 3, Siswania: Beads of semi-precious stones, coral and glass



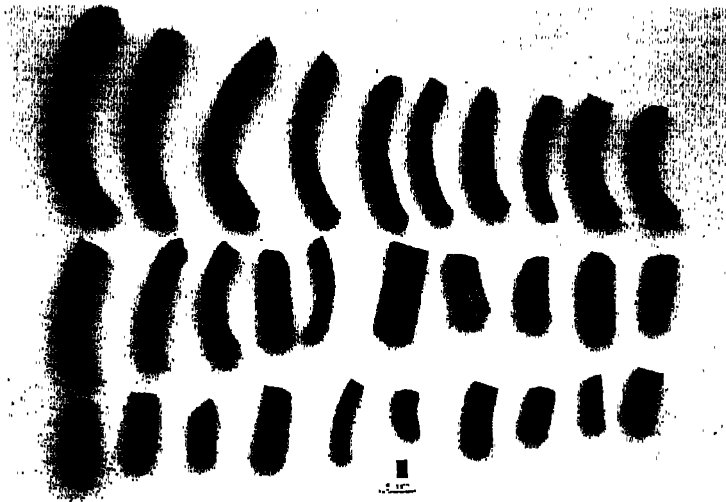
Kanungo & Misra, Pl. 1, Kopia: Pot with *nandipada* (red slipped ware)



Kanungo & Misra, Pl. 2, Kopia: Kushana coins



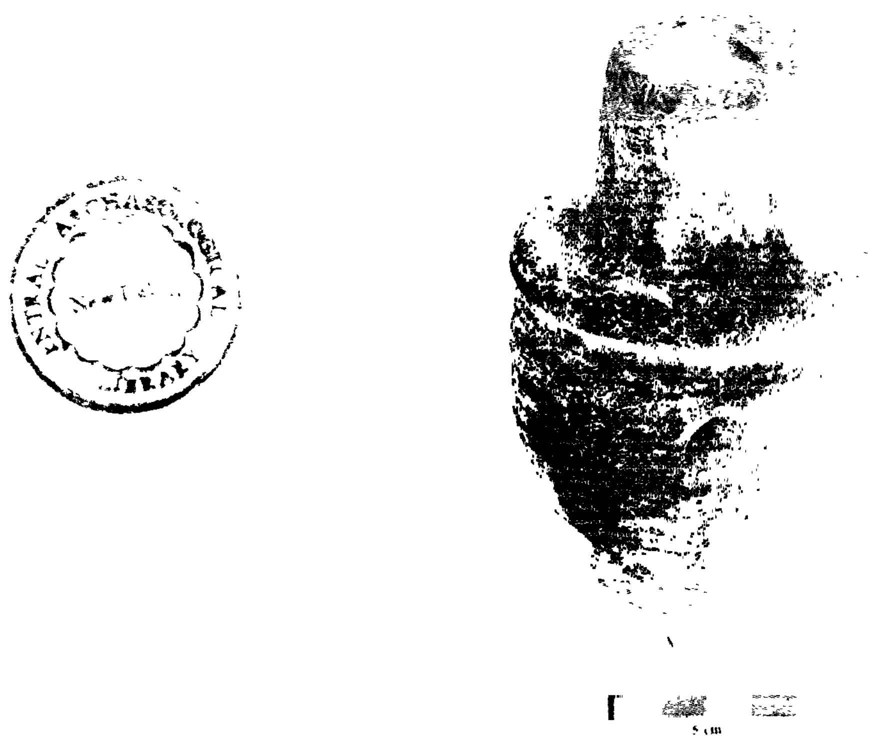
Kanungo & Misra, Pl. 3, Kopia Glass beads



Kanungo & Misra, Pl. 4, Kopia: Glass bangles

Kanungo & Misra, Pl. 5, Kopia: Crucible





Kanungo & Misra, Pl. 6, Kopia: Crucible



Kanungo & Misra, Pl. 7, Kopia: Fragments of crucibles



